amateur radio

VOL. 45, No. 10 OCTOBER 1977

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COVER PHOTO

Members of the Summerland Radio Club, Lismore, NSW, adjust a 2 metre beam in the club's recent WICEN exercise. (See article on page 19.) Members from left to right are Harold Wright VK2AWH (Secretary), Eric Speeding, Wayne Everingham, Fred Herron VK2BHE (President and WICEN Co-ordinator).

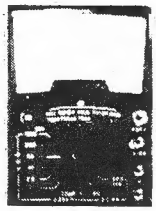
JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

HAM RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC., 3000

Phones: 67-7329, 67-4286

Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 9.00 a.m. to 5.00 p.m., and on Saturdays to midday.



MODEL OL64 D/P MULTIMETER. Very ruggedly constructed this model is particularly suitable for workshops. It features special scales for measurement of capacitance and inductance. Diode protested movement: **Specifications:** 20,000 ohm/volt DC. 8,000 ohm/volt AC. DC volts — 0.25; 1; 2.5V; 10; 50; 250; 1,000; 5,000. AC volts — 10; 50; 250; 1,000. DC amps: 50 uA; 1 mA; 50 mA; 500 mA; 10 A. Ohms — 4 K ohm; 400 K ohm; 4 M ohm; 40 M ohm. Centre scale — 40 ohm; 4,000 ohm; 40,000 ohm; 400,000 ohm. Decibel: —20 to +62 dB, Dimensions: 6" x 4-1/5" x 2"; 152 x 107 x 51 mm. Inductance — 0/5000H. Carrying case available, Model C $6.90.

$32.50 Postage $2.20

E.E.I. PORTABLE RADIO

AM/AIR VHF

SPECIFICATIONS:

Freq. Range: AM530-1600 kHz, AIR (VHF) 108-174 MHz. **Intermed. Freq.:** AM 465 kHz, FM 10.7 MHz. **Output:** 450 mW max. **Speaker:** 2½" permanent—magnetic dynamic type, 8 ohm. **Power Source:** DC — 6V (4 x UM3 Penlite) or equivalent. **Semiconductor:** 10 trans., 7 diode. **Dimensions:** 8½" (W) x 4½" (H) x 1-7/8" (D)

$18.90 — Postage $1.40

MODEL AS100 D/P MULTIMETER

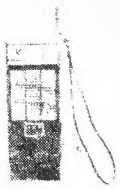
This meter features double zener diode meter protection and 3½" full view easy to read 2 colour scale. It is fitted with polarity reversing switch and housed in a strong moulded case with carrying handle.

SPECIFICATION: 1000,000 ohm/volt DC. 10,0000 ohm/volt AC. **DC Volts:** 0.3, 3, 12, 60, 120, 300, 600, 1,200. **AC Volts:** 6, 30, 120, 300, 600, 1,200. **DC Amps:** 12 uA, 6 mA, 60 mA, 300 mA, 12A. **Ohms:** 2k, 200k, 2m, 20m, 200m ohm. **Centre Scale:** 20 ohm, 2,000 ohm, 20,000 ohm, 200,000 ohm, 20m ohm. **Decibel** —20 to +57 db. **Dimensions:** 7-3/5 x 5-2/5 x 2-3/5 ins.

Carrying case for model I — $7.90.

Price: $52.50 — Postage $2.20.

MODEL NC-310 DE LUXE 1 WATT 3 CHANNEL C.B. TRANSCEIVER



- **WITH CALL SYSTEM**
- **EXTERNAL AERIAL CONNECTION**

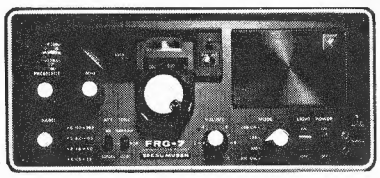
SPECIFICATIONS, NC-310

Transistors: 13.
Channel Number: 3, 27.24 OMHz Citz. Band.
Transmitter Frequency Tolerance: ± 0.005%.
RF Input Power: 1 Watt.
Tone Call Frequency: 2000 Hz.
Receiver type: Superheterodyne.
Receiver Sensitivity: 0.7 uV at 10 dB S/N.
Selectivity: 45 dB at ± 10 kHz.
IF Frequency: 455 kHz.
Audio Output: 500 mW to External Speaker Jack.
Power Supply: 8 UM-3 (penlite battery).
Current Drain: Transmitter: 120-220 mA.
Receiver: 20-130 mA.

Price: $105.00 — Postage $1.40

YAESU FRG-7

THE RADIO FOR WORLD-WIDE LISTENING AT ITS BEST — 0.5-29.9 MHz COVERAGE SYNTHESIZED COMMUNICATION RECEIVER



The model FRG-7 is a precision built high performance communication receiver designed to cover the band from 0.5-29.9 MHz. Its state of the art technology offers an unprecedented level of versatility. The Wadley Loop System (drift cancellation circuit) coupled with a triple conversion super heterodyne system guarantees an extremely high sensitivity and excellent stability. It provides complete satisfaction to amateurs as well as BCLs with superb performance and many features such as RF attenuator, selectable tone, and automatic noise suppression circuit.

$328

SOLID STATE 19 TRANSISTOR MULTI-BAND RADIO — 9 RANGES

FREQ. RANGE:
AM 535-1605 kHz,
MB1 1.6-2.4 MHz, MB2
2.8-4.4 MHz, SW1 4-6 MHz, SW2 7-12 MHz, FM 88-108 MHz, VHF1 108-135 MHz, VHF2 140-175 MHz, VHF3 162.5 MHz. **I.F. FREQ.:** AM 455 kHz, MB 455 kHz, SW 455 kHz, FM 10.7 MHz, VHF 10.7 MHz. **OUPUT POWER:** 800 mW. **SPEAKER:** 4" 8 ohm dynamic. **POWER SOURCE:** AC 220-240 volt 60 Hz, DC 6 V UM1 x 4 PCS. **ANTENNA:** AM, MB and SW — ferrite cores, FM and VHF — rod antenna. **DIMENSIONS:** 12½" L x 8½" H x 4" D.

SPECIAL PRICE **$65** Post Pack $3.00

MULTI-BAND RADIO

SPECIFICATIONS:

Circuit: 16 Transistors, 15 Diodes, 1 Varistor and 2 Rectifiers.
Frequency Range: AM 535-1605 kHz, FM 88-108 MHz, TVI 56-108 MHz, TV2 174-217 MHz, AIR/PB2 110-174 MHz and WB 162.5 MHz.
Power Source: AC 240 Volts 60 Hz 4 Watts, DC 6 Volts.
Power Output: 350 mW (max.) 250 mW (undist.)
Dimension: 9⅜" x 3¾" x 8".
Weight: 4¼ lb. (approx.)
Supplied Accessories: Earphone, Batteries (4 size D).

$49.00 — Postage $2.50

HANIMEX AM/CB/FM SOLID STATE PORTABLE RADIO Model 2818

OWNER'S GUIDE — Operating Instructions.

SPECIFICATIONS:

Semiconductor Complement:
22 Solid State Devices (11 transistors, 11 diodes).
Frequency Range:
AM540-1600 kHz, CB channel 1-40, FM 88-108 MHz.
Intermediate Frequency:
AM/CB 455 kHz, FM 10.7 MHz.
Output Power:
300 mW Maximum, 10% Distortion 200 mW.
Speaker:
3" 8 ohm Dynamic.
Power Source:
Battery 6V "A-A" size.
Antenna:
AM Ferrite Bar Antenna, CB/FM Rod Ant.
Dimensions:
7" Height x 3.5" Width x 1⅞" Depth.
Weight:
1 lb. (without Battery).

$24.50 — Postage $1.50

E.E.I. SOLID STATE CAR RADIO

MW BAND
PUSH-BUTTON TUNING

SPECIFICATIONS:

Power Supply: 12 V DC
Receiving Frequency: MW 520KC (580M) — 1640KC (183M)
Intermediate Frequency: 455KC
Audio Output: 4.5W
Transistors: 8, diode 4
Speaker: 5" Permanent Dynamic 4 ohm
Sensitivity: Less than 20 uV at 20 N/S
Selectivity: More than 25 dB at + 10 kHz detuning
A.G.C.: More than 45 dB at 1,000 kHz
IF Rejection: More than 40 dB at 600 kHz
IM Rejection: More than 50 dB at 1,400 kHz
Cabinet Dimension: 1-7/8" (H) x 6-1/5" (W) x 4-1/8" (D)

$35.90 — Free Post

BARLOW-WADLEY XCR-30

a truly portable communications receiver, based on the WADLEY LOOP principle, the same principle as applied in the DELTAHET and RACAL receivers. A truly crystal-controlled highly sensitive multiple-heterodyne portable receiver of exceptional stability with continuous, uninterrupted coverage from 500 kHz to 31MHz.

All for **$310.00** F.O.R.

MAIL ORDERS WELCOMED. Please allow pack and post on items listed on this page. If further information required send a stamped SAE for immediate reply from the above address. Larger items can be sent F.O.B. Due to circumstances beyond our control, prices quoted in this advertisement are subject to alteration without notice. New equipment available at our Bridge Road Store.

amateur radio

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The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason

Advertising:
Advertising material should be sent direct to **P.O. Box 150, Toorak, Vic., 3142,** by the **25th of the second month preceding publication. Phone: (03) 24 8652.**
Hamads should be sent direct to **P.O. Box 150, Toorak, Vic., 3142,** by the **3rd of the month preceding publication.**

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QSP: CB — WHAT NOW?

Legal CB is a fact of life.

Amateurs have "temporarily" lost the 11 metre band. We say "temporarily" not because we do not accept the sincerity of the Minister and his advisers (we do), but because we doubt the practicability of clearing that band when the time comes.

The Institute believes that there are grounds for legitmate criticism of the way the issue has been handled and also that there are some very valuable potential advantages for the Amateur Service arising from the introduction of CB.

Let's make our criticism clear. Quite apart from the loss of the 11 metre band, bad enough in itself, there are features that make that loss worse

The Institute argued that Novices should be allowed to use the 10 metre band. The Department insisted on allocating the 11 metre band. So Novices set themselves up on 11 metres, only to be told to shift back to the very band the Institute had proposed all along. Many Amateurs have expressed concern that "might" seems to have become "right". Meanwhile, the law-abiding Amateur sees legitimate request after request piling up in some bottomless Departmental "pending" tray

The Institute does not criticize CB as such. It does, however, see recent history as a sorry story of Departmental procrastination, bungling and ineptitude.

In fact, the Institute sees the introduction of CB as an important phase in the growth of Amateur Radio in Australia. Most CBers want to be law-abiding. There are a few that have shown themselves to be irresponsible, to say the least, but the same criticism could be levelled at some (though very few) Amateurs.

For many CB is the first introduction to radio communication. Many have found quickly how much more the Amateur can do. They aspire to become Amateurs, first Novices and then Full licensees. That's no new discovery on our part. ARRL has embarked on a program of seeking to attract CBers to Amateur ranks. Many individuals and clubs in Australia have already started to do that, too.

The numbers of amateurs in the USA and the membership of ARRL has grown thanks, in part, to CB. We say "in part" because the other part has been the active encouragement of converts by ARRL and US amateurs. The message for us is clear. We are not at war with CB radio. We want CBers to upgrade to Amateur Radio.

We should make one point very clear. It was suggested that CB could be introduced in Australia as a fourth kind of Amateur licence, without code, and with no more proficiency than the ability to know which knob to turn. The Institute rejects that flatly. That is pulling the Amateur Service the wrong way — we hope that CBers want to become Amateurs. If Amateurs become CBers, the whole foundation for the Amateur Service is lost. We have privileges, yes, but that is privilege that has been earned, individually and collectively.

So let's sum up what the Institute says about CB and the wider implications of recent history. We have made our point about the manner in which CB has been introduced We take that point further. With the introduction of CB we have seen a significant area of de-regulation. The Institute has, we believe, acted with responsibility and restraint. We urge Amateurs individually to do the same. But that should not be the basis for the Department to pretend that Amateurs can be ignored. It is now up to the Department to show that it can be responsive to the highly disciplined and law-abiding group constituting the Amateurs of this country.

Our next point is this. There is a law governing the use of radio frequency. We have seen that law not enforced, but ignored. The Institute sees a real need for new legislation, capable of proper enforcement, dealing, for example, harshly with hoax distress calls and the like. That law should be enforced. Curbs in government spending are not a matter on which the Institute makes any general comment. It does make the specific comment that law enforcement should not be curtailed for reasons of economy. The law must be a law that does not inhibit the legitimate use of radio frequency by pettifogging regulation, but does enable easier control of illegitimate use of radio frequency. There is a distinction between necessary regulation and unnecessary regulation. Unnecessary regulation imposes a cost burden on the administrator and the licensee, and may be self defeating in that restriction without reason will never achieve acceptance.

Our final point is this. We welcome the introduction of CB radio as a vast reservoir of potential Amateurs. Many, we know, will be content to use what they now have. Others will, for the very reasons that led them into CB, seek to widen their horizons by becoming Amateurs.

We will be very foolish indeed if we do anything less than offering these people the fullest encouragement to "upgrade to Amateur Radio".

M. J. OWEN, VK3KI,
On behalf of the Executive. ■

QSP

HISTORY OF RAAF ORGANISATION

A letter received from Group Captain E. R. (Bon) Hall advises he has written a book entitled "A Saga of Achievement" due to become available early next year.

In a very warm and faithful history, the book traces the RAAF radio story through more than 350 pages and over 130 photographs from the 1st Wireless Section of the AFC in 1916, to the space age of the 1960s. It is a vertiable treasure house of names, interest, humour, accounts of achievement, and stories of escape and bravery.

The RAAF Wireless reserve was conducted for many years under the auspices of the WIA, and its members went on to make an outstanding contribution to the RAAF radio success during World War II.

This book will be of limited publication and will not be sold in bookshops. Order your copy now by sending $12.50 plus postage and packing (Vic. $1, NSW, SA, Tas $2.20, Qld, WA, NT $2.50) to Bonall Publishing, 17 Orchard Cres., Box Hill North, Vic. 3129.

EDITOR'S DESK

By BRUCE BATHOLS
VK3UV

HAMADS CONTROVERSY??

I have often heard the comment that many items of equipment offered for sale in the Hamads column of this magazine have been sold before the particular issue containing the advertisement has been published.

If one considers the facts in a little more depth, then the following possibilities come to mind.

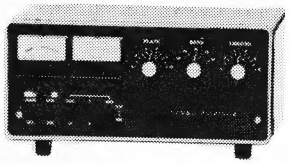
Most important to consider is the person who has the goods for sale, he obviously is not concerned to whom the item is sold to — he just wants to sell it, and as quickly as possible.

In several instances we have observed that an advertiser has sold goods by word of mouth, or simultaneously advertised the item in other publications to obtain the widest market possible, and

continued P.5

SIDEBAND ELECTRONICS SALES

The world's first digitally tuned 80M-10M SSB transceiver
with over 40,000 frequency synthesized channels.



● 1200 Watt Linear Amplifier FL-2100B

The FL-2100B is a conservatively rated matching amplifier for the FT-101E. This amplifier features two rugged 572B carbon plate tubes in a class B grounded-grid circuit with individually tuned input coils for each band. The FL-2100B operates on 80 thru 10 Meters with dual cooling fan and a solid-state power supply with an effective 2B uF filter system, providing reserve ratings and linear operation. Dual

Features

* Conservative, 1200 Watts PEP input on 80-10 Meters
* Easy primary voltage change from 117-234 VAC
* Dual front panel meters provide continuous monitoring of plate current and voltage

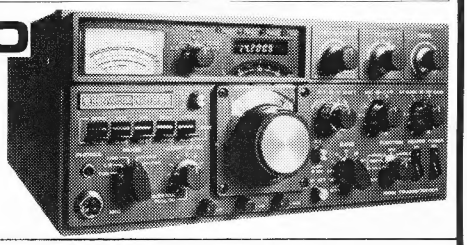
TS-820 PERFORMANCE SPECIFICATIONS

Frequency Range	160 meter band 1.8 to 2.0 MHz 80 meter band 3.5 to 4.0 MHz 40 meter band 7.0 to 7.3 MHz 20 meter band 14.0 to 14.35 MHz 15 meter band 21.0 to 21.45 MHz 10 meter band 28.0 to 28.5 MHz, 28.5 to 29.0 MHz, 29.0 to 29.5 MHz, 29.5 to 29.7 MHz WWV 15.0 MHz (receive only) AUX band	Side Band Suppression	Better than 50 dB (Mod. freq. at 1.5 kHz)
Mode	CW, USB, LSB, FSK	Microphone	High impedance (50 kΩ)
RF Input Power	SSB 200 Watts PEP SW 160 Watts DC FSK 160 Watts DC	AF Response	400 to 2,600 Hz
Antenna Impedance	50 to 75 ohms, unbalanced	Spurious Radiation	Harmonics Less than -40 dB Others Less than -60 dB
Carrier Suppression	Better than 40 dB (Mod. freq. at 1.5 kHz)	Receiving Sensitivity	S/N 10 dB or better at 0.25μV
		Image Ratio	160 to 15 meter band Better than 60 dB 10 meter band Better than 50 dB
		IF Rejection	Better than 80 dB
		Frequency Stability	Within ±1 kHz during one hour after one minute of warm-up, and within 100 Hz during 30 minute period thereafter
		Receiving Selectivity	SSB 2.4 kHz (-6 dB) 4.4 kHz (-60 dB) CW 0.5 kHz (-6 dB), with optional CW filter 1.5 kHz (-60 dB), with optional CW filter
		AF Output Power	More than 1.5 watts (with less than 10% distortion) into an 8 ohms load
		Audio Output Impedance	4 to 16 ohms (speaker or head phone)
		Tube and Semi-conductors	3 tubes (2 x 5200 A, 12BY7A) 5 ICs 30 FETs 74 transistors 165 diodes
		Power Requirements	120/220V AC, 50/60Hz
		Power Consumption	Transmit 280 watts Receive 26 watts (with heater off)
		Dimensions	13 1/8 (333) wide x 6 0 (153) high x 13 3/16 deep inch (mm)
		Weight	35.2 lbs (16 kg)

*Specification and designs are subject to change without prior notice

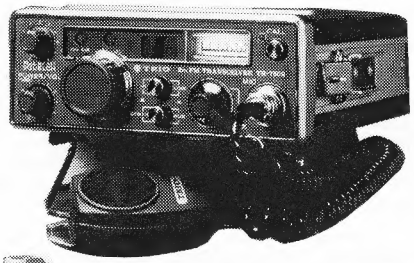
TS-820 SERIES
TS-820/
VFO-820

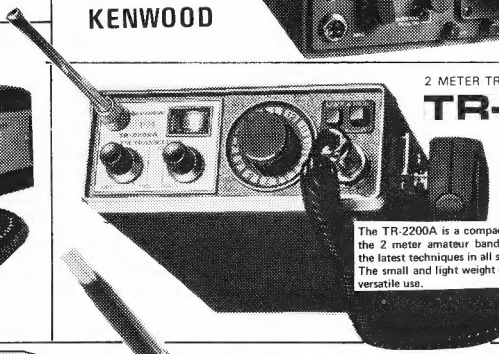
KENWOOD



NEW MODEL T.S. – 520s

T R – 7500 144MHz F.M.





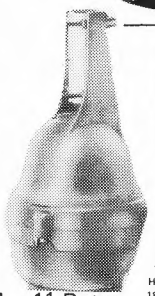
2 METER TRANSCEIVER
TR-2200A

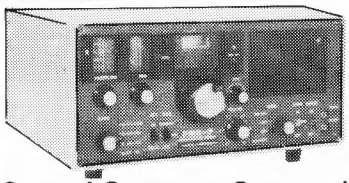
KENWOOD

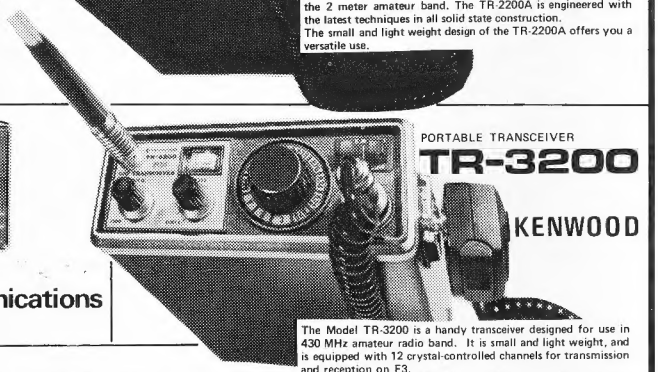
The TR-2200A is a compact FM tranceiver designed for use in the 2 meter amateur band. The TR-2200A is engineered with the latest techniques in all solid state construction.
The small and light weight design of the TR-2200A offers you a versatile use.

TR-7400A

The hottest 2-meter mobile rig on the market. Features a brand new and unique squelch system with continuous tone coded squelch, tone burst, or carrier squelch. Full 4 MHz band coverage and 25 watt output. It's phase-locked loop (PLL) frequency synthesizer provides operation on 800 channels. The TR-7400A's list of features goes on and on, but even more important is its superb performance and dependability . . . and all at a surprisingly low price.







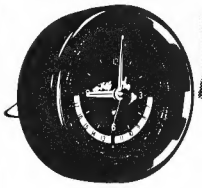
PORTABLE TRANSCEIVER
TR-3200

KENWOOD

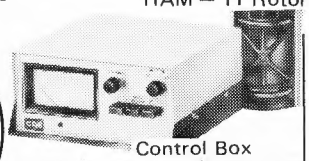
The Model TR-3200 is a handy transceiver designed for use in 430 MHz amateur radio band. It is small and light weight, and is equipped with 12 crystal-controlled channels for transmission and reception on F3.
The RF output power is switchable in 2 steps, either 2 watts or 0.4 watt.

General Coverage Communications Receiver FRG-7

World Clock QTR-24



HAM – 11 Rotor



Control Box

INDICATOR CONTROL UNITS
KR-500 KR-400

ELEVATION
180 DEGREE

HORIZONTAL
360 DEGREE

HORIZONTAL ROTATOR

KR-400

HY-GAIN ANTENNAS
18AVT-WB 10-80 M, temporarily out of stock
TH3MK3 10-15-20 senior 3 el. Yagi 14' boom
TH6DXX 10-15-20 senior 6 el. Yagi 24' boom
HY-QUAD 10-15-20 cubical quad Yagi 8' boom
TIGER ARRAY 204BA 20M4 el. Yagi 26' boom
BN-86 balun for beam purchases only

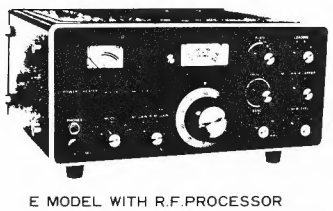
MARK MOBILE ANTENNAS
HW-80, 6' long for 80 M.
HW-40, 6' long for 40 M.
HW-20, 6' long for 20 M.
Swivel mounts & chrome-plated springs for all

CUSH CRAFT ANTENNAS
A144-11-11 Element 2M Yagi
A147-11-11 Element 2 M Yagi
A147-20 combination horizontal vertical 2 M

ANTENNA ROTATORS
Model CDR Ham-11 for all hf beams except 40 M
Model CDR AR-22 L junior rotator for small beams
KEN model KR-400 for all medium size hf beams with internal disc brake
All models rotators come complete with 230-volt AC indicator control units.
6-conductor cable for
KR-400-500 **65 cents per metre**

Deluxe Mobile/Base Station FT-101E

● Solid State 160 thru 10 Meter Transceiver

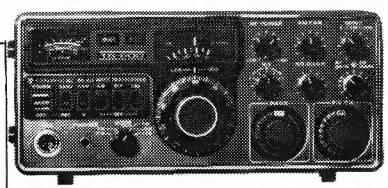


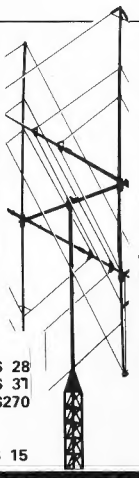
E MODEL WITH R.F.PROCESSOR

"computer type" modules for unparalleled reliability and service. New lever type switches offer easier operation. Here is a complete radio station designed to go anywhere-ideal for todays active amateur. Just add an antenna and 12 VDC or 100-234 VAC for instant operation on 160 thru 10 meters. The FT-101E/EE is another step forward in amateur communications from the world's leader in communications equipment. YAESU- The Radio Company.

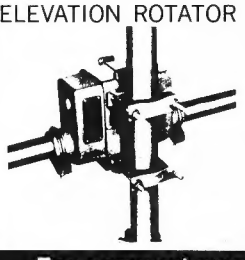
The world's number one transceiver now offers even more value and performance in one compact, thirty pound package. An effective RF Speech Processor is a built-in integral part of this exciting transceiver. Now you can realize that extra talk power to cut through the pile-ups without the addition of a linear amplifier. Except for the final and driver stages, the FT-101E/EE features the latest in solid state technology, incorporating time proven, plug-in

Kenwood has opened the 6-meter band to the amateur who wants to go first class without paying an arm and a leg. Behind its pretty face is a ruggedly built, versatile performer offering full 4 MHz coverage (50-54), all modes (SSB, FM, CW, and AM), and 10 watts out.

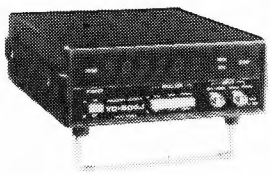




KR-500 MODEL ELEVATION ROTATOR



500MHz Frequency Counter



● YC-500S and YC-500J are available at lower prices.

SWR METER
Twin meter model: Y.M. - I.E. 3.5 to 145 MHz prof quality $ 28
DRAKE TV - 3300 TV I lowpass filter $ 31
SSR-1 Receivers $270
CRYSTAL FILTER, 9 MHz, similar to FT-200 ones. With carrier crystals.
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ICOM
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WIANEWS

Three Postal Motions were issued during August for voting by Federal Council.

The first dealt with the additional two metre repeater frequencies to form the basis of application to the P. and T. Department. The input/output channel frequencies are to be — 147.65/147.05, 147.70/147.10, 147.75/147.15, 147.80/147.20, 147.85/147.25, 147.90/147.30 and 147.95/147.35 MHz.

Arising from the foregoing, the second Postal Motion proposed the adoption of additional national 2m FM simplex channels as follows — Ch. 68 — 147.400, 69 — 147.450, 70 — 147.500 (secondary national FM calling frequency), 71 — 147.550 and 72 — 147.600 MHz.

The third Postal Motion recommended frequencies in the 10m band for converting 11m "CB" equipment for Novice amateur use. The channel frequencies are recommended to be translated upwards by 1.335 MHz so that the six USB and AM primary frequencies become 28.3, 28.35, 28.4, 28.45, 28.5 and 28.55 MHz in the following configuration —

28.3	28.35	28.4	28.45	28.5	28.55
28.31	28.36	28.41	28.46	28.51	28.56
28.32	28.37	28.42	28.47	28.52	(28.57)
28.34	28.39	28.44	28.49	28.54	28.59

This is NOT a band plan; it is a standard set of recommended frequencies to assist in achieving uniformity where channelised equipment is to be converted.

There are reasonable grounds for believing these three postal motions will be passed.

During August a circular was sent to all known importers of 70cm equipment advising them the exact details of the WIA 70cm band plan in respect of FM simplex and repeater frequencies/channels.

Clarification from the P. and T. Department confirmed that the Novice examinations brought forward to 25th October included the Novice morse exam also.

Further details came forward relating to the FM "induction system" hearing aid developed for short range (e.g. classroom distances) use up to about 27 metres in the part of the spectrum between 3 and 4 MHz.

Publication Committee discussions about the special issue of Amateur Radio for December crystallised into this being put out as a book which will be designed for sale by book shops in a similar manner to the 1977 WIA Call Book. ■

EDITOR'S DESK — continued

subsequently has neglected to advise the AR office so that the advertisement may be cancelled.

Delays in mail distribution are also a factor and one which we have no control over, as some items advertised are disposed of in one State before another State even receives the magazine. (AR is posted to all States at the same time at the GPO, Melbourne.)

To meet printing deadlines, copy is required by the third day of the month prior to publication, therefore the Hamad is at least one month old before it appears in AR. The seller has an opportunity to sell the goods via other means in the interim.

The Hamads column is a free service to members for those who desire to let others know they have an item for sale, or wish to purchase, exchange, etc.

If you are selling an item through Hamads and it is sold prior to publication of the advertisement, please endeavour to contact the office.

If the item is sold as a result of the AR Hamad, then the column has done its job for you. ■

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for Antennae

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Scalar's range of HIGH GAIN base station antennas provide an omnidirectional radiation pattern combined with gains of 3 dB and 6 dB depending on Model number. They are designed as base station antennas for two-way radio systems. Constructed of high grade aluminium, the radiating elements are completely enclosed within a fibreglass radome.

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A MORSE TO ASCII CONVERTER

H. L. HEPBURN
VK3AFQ

The recent appearance on the amateur scene of the Visual Display Unit (or VDU), and the ready availability of modern keyboards, has provided a fresh field of interest. So far, applications have tended to be in the area of radio-teletype (or RTTY) where the new hardware can replace the noisy mechanical contraptions of the past. Some attention has been given to the use of keyboards for the transmission of the much more prevalent morse code, but articles dealing with the reception and display of morse code are quite rare — a notable exception being one by Tom Riley WA1BYM in the October to December 1975 issues of QST. The article now presented describes a unit that accepts morse code from the audio section of the station receiver and converts it to the ASCII coding accepted by VDU's, microprocessors and computers.

It borrows much from the Riley design but considerable operating improvements and reductions in complexity have been made. The result is the ability to tune into a morse transmission and read what is being sent in plain English on a small TV screen.

Morse code as received is in serial form — that is, dots, dashes and spaces follow one after the other. The specific sequence of dots, dashes and spaces determine the individual letter or figure required.

Thus to decode morse it is first necessary to recognise the dot/dash/space relationships making up letters and words, and then to transform whatever intermediate indicators are produced into ASCII coding in its parallel form, i.e. all the bits representing the particular letter or figure presented to the VDU at the same time and not sequentially.

The converter now described can be split into four main functional steps:

1. The input processor which accepts audio morse from the station receiver, filters it to reduce noise and then turns it into TTL compatible highs and lows. A high represents a mark (i.e. a dot or a dash) and a low a space.
2. The counting stages which determine the lengths of marks and spaces and transforms them into mutually exclusive outputs which show whether the element was a dot or a dash or a space between letters or a space between words.
3. The control stages which accept the output from the space counters and determine whether they are spaces within a character or spaces between letters, or spaces between words and, having so determined, cause the storage and conversion stages to output the right thing at the right time.
4. The storage and conversion stages which accept the outputs from the mark counters, store them as required and then turn them into a six bit ASCII code.

These sections will now be described in some detail. The complete circuit diagram of the converter is given in Figure 1, while the physical layout of the component on the 6 in. x 7 in. single sided circuit board is given in Figure 2. Figure 3 gives the set up required for programming the PRIM and Figure 4 shows the wave forms at various points.

1. THE INPUT PROCESSOR

The input processor consists of an (optional) preamplifier and band pass filter constructed round a LM3900 Norton quad op-amp, two NE555s as detectors, a 2N3565 switch and, finally, two sections of a 7414 Hex Shmitt trigger to ensure fast rise and fall times. A LED indicator is also provided which echoes the signal being received.

Whilst it is relatively simple to take audio from the speaker terminals of the station receiver, it should be noted that changes made to the audio level of the Rx will react back on the sensitivity control of the converter. If possible the best place to obtain audio is from a point within the Rx prior to the audio level control. This is usually the "hot" end of the audio level potentiometer.

The first section of the LM3900 is used as an (optional) audio amplifier with a fixed gain of 10. Should the audio available from the fixed source within the Rx give more than 200 mV RMS this amplifier is not needed and may be omitted.

Sections 2 and 3 of the LM3900 act as a band pass filter centred on 1000 Hz. It has a Q of around 14 (and thus a bandwidth at the —3 dB points of some 70 Hz) and a gain of 10-11. These specifications make the filter adequate for code speeds up to 60 w.p.m. The two 0.1 capacitors should be of the greencap or styroseal type and be matched to within 2-3 per cent of each other. Note that the absolute value of these capacitors is less important than their matching. The resistors should be normal 5 per cent tolerance items.

Table 1 gives the values required for R1 to R8 for a selection of bandwidths and gain. If code speeds in excess of 60 w.p.m. are visualised then a filter having a lower Q should be used to prevent ringing.

Whilst the converter can be used without the BPF, its omission will certainly lead to greater readout errors caused by static spikes or by interference from adjacent signals.

The first NE555 acts as an adjustable threshold detector giving a logic 1 output when the audio input is above a certain level. An RC filter consisting of the 56K resistor and 0.1 mFd capacitor averages the output and applies it to a second NE555 used as a fixed threshold detector having hysterisis. The output of the FTD goes from 0 to 1 when the input rises through 1.6V but does not change from 1 back to 0 until the input descends through 0.8V. This hysterisis prevents multiple output pulses which would occur if a single threshold were employed.

The 2N3565 and the 7414 are used to ensure the output of the detectors have fast rise and fall times. They were added to the original Riley circuitry to prevent false readouts caused by the relatively slow rise and fall times on the output of the NE555s.

The final output of the processor is thus a TTL compatible "high" (or 1) during a mark and a TTL compatible "low" (or 0) during spaces.

Provision is made for a LED which is on during a mark and off during a space. The LED thus echoes the received signal. If mounted near the Rx it provides a very valuable tuning aid.

2. THE COUNTER AND CONTROL STAGES

The basic time unit of the morse code is the lot and all other character lengths are related to this. For perfect morse a dash has a length equal to 3 dots. The spaces between dots and dashes within any individual letter or figure (the character space) should be one dot long, the space between letters or figures within a word should be three dots long, while the space between words should be seven dots long.

The actual time duration of the various elements does, of course, depend on the speed at which the code is sent. At 20 w.p.m. the dot is about 60 mS long, twice as long at 10 w.p.m. and only half as long at 40 w.p.m. So, even for perfect morse, we have to provide for speed variations. Since perfectly formed morse code cannot be assumed, the decoding logic must also show as much tolerance as possible towards imperfectly formed characters.

Consider first the marks. If a 20 w.p.m. dot is fed to one input of a simple gate and a clock input of 100 Hz fed to the other input of the gate, then the output of the gate should — for perfect morse code — be 1000 Hz x 60 mS = 60 pulses. Had the mark been a dash, the gate would have put on three times this, or 180 impulses. If the number of pulses passed by the gate are now connected in a simple binary counter, then the number of pulses indicated at the end of the mark should determine whether the mark was a dot or a dash. However, a little thought will show that we can simplify things a lot by picking some single intermediate pulse

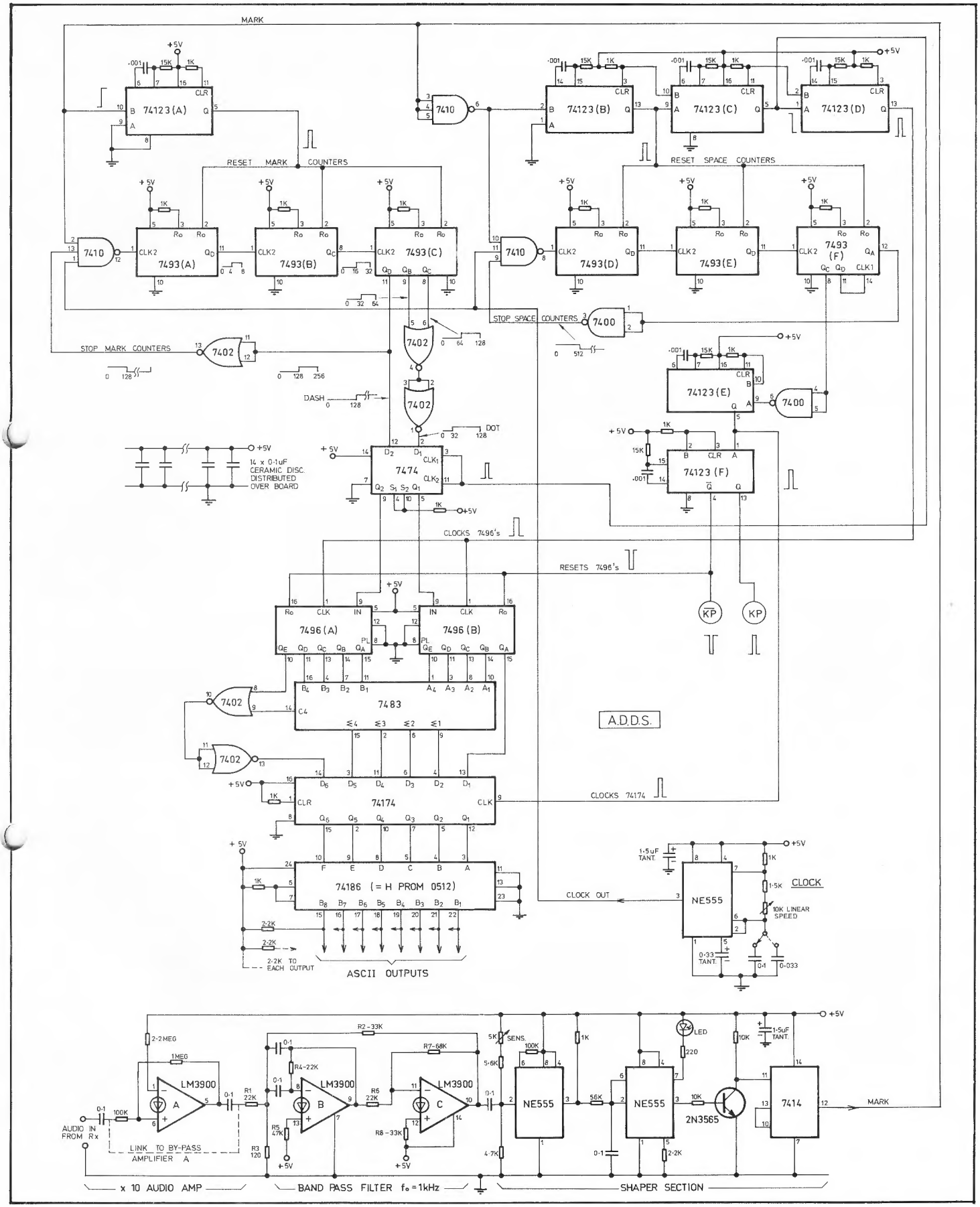

FIG. 1: Morse Code to ASCII Converter.

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THINK HARD BEFORE YOU BUY

Buying yourself a 2m fm mobile rig is quite an expensive exercise and it is well worth taking time off to think and put down a few comparisons before you buy. The **IC22S** has some great features which include:

- **No hassles** with mobile operation, no difficult to read digital displays or maze of knobs.
- **Synthesiser** with programmable 25KHz frequencies 146-148 MHz. Units come pre-wired for R1-8, 40, 50 and 51.
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- Price — well a real bargain at **$279!**

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IC202

IC502 6m ssb	**$219**
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OTHER TRANSCEIVERS

IC211 2m all-mode	**$785**
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DAWA NEW

DAIWA RF SPEECH PROCESSORS

Daiwa have introduced a new range of RF speech processors which are simply attached into the microphone line. Two new models are available, model **RF440** which features a phase shift network and model **RF550** which utilises a crystal filter. The processors are a suitable alternative to a linear amplifier — up to 6dB gain (4 times) improvement on the signal can be expected! Both models feature 240vac/13.9vdc operation and include compression level monitoring via a front panel meter. Impedance is switchable 50K/600ohms with distortion better than 3%.

Model RF440 (phase shift)	$112
Model RF550 (crystal Filter)	$14[illegible]
Model MC330 (audio compressor)	$[illegible]

KENWOOD

pacesetter in amateur radio

TS660 6m transceiver	**$699**
TS700A 2m all mode transceiver	**$640**
TR3200 70cm fm transceiver	**$299**
TR7400 digital 25w, 2m fm	**$385**

Write for the **VICOM** Kenwood Catalog.
All rigs covered by **VICOM** 90 day warranty.

OTHER TRIO-KENWOOD GEAR

TS820S transceiver	**$990**
DG-5 digital display for TS520S	**$169**
VFO-820 External VFO TS820S	**$145**
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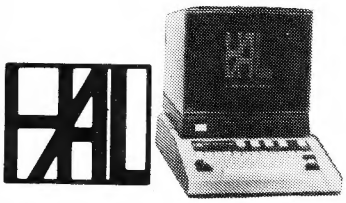
TV502 2m transverter	**$260**
TV506 6m transverter	**$229**

The popular **VICOM VC2** swr and power meter is specially designed for the serious communicator looking for accurate readings. The bridge operates from 3 thru 150MHz with power measurement either 12 or 120 watts. Will handle up to 1000 watts. Individually calibrated power chart for all Australian Amateur bands and 27MHz CB. A real bargain at this price!

$38



The new **HAL KSR3000** send/receive RTTY terminal including keyboard and video display, features scrolling, continuous, word or line transmission and firmware for word wrap-around and blankfill. Handles Baudot and ASC11 (8-level) with a screen size up to 1152 chs. List price **$1499.** Write (including SAE) for complete specifications.

MORSE KEYS	
Economy model KH708	**$19**
Operator model HK706	**$20**
Deluxe model HK702	**$35**
Electronic Keyer EK103	**$159**
Manipulator MK701	**$38**

NOISE BRIDGES	
Te7-01 up to 100 MHz	**$39**
Te7-02 up to 300 MHz	**$49**

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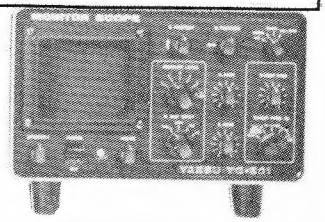
YAESU



You can maintain the cleanest sounding signal on the band with the **YAESU** YO301 Monitorscope. Compatible with virtually all transmitters and receivers, the YO310 features all-mode monitoring including RTTY. Complete with comprehensive instruction manual. Price **$339.**

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WARNING
Prospective purchasers may be asked to provide evidence that he/she is a legally licenced novice or amateur operator.

Yaesu FT101E
160m thru 10m, complete with RF processor, 90 day **VICOM** warranty, back-up technical support. Price **$839**

FRG-7 using Wadley Loop system with coverage 0.5 thru 29.9MHz with 10KHz readout. Price **$328**

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Includes information on FM theory, design, equipment, moon reflection and how to build converters and transceivers for VHF **$9** + P & P

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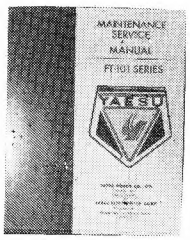
ATTENTION FT101/E OWNERS
The new comprehensive service manual for the **FT101** series is now available from **VICOM.** This superb manual includes valuable information on trouble-shooting, detailed data on pcbs, useful modifications — an absolute must for the ham wishing to maintain his/her/it's own gear. Price **$30** includes postage anywhere in Australia. But be quick. We only have a limited quantity!



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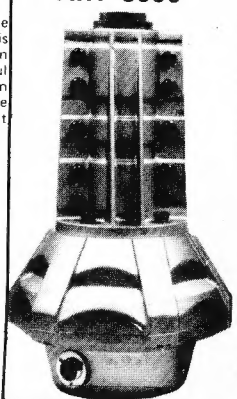
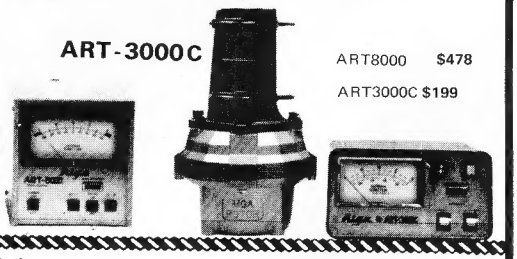


MODEL NO.	ART-8000	ART-3000C
Rotating Torque	2,500kg/cm	850kg/cm
Braking Torque	10,000kg/cm	1,700 kg/cm
Maximum Vertical Load	2,500 kg	250 kg
Control Accuracy	± 5°	± 5°
Drive Type	Gear	Gear
Operation Temperature	−40°~ +80°C	−40°~ +80°C
Forward/Reverse Delay	3 seconds	3 seconds
Maximum Continued OP.	20 minutes	3 minutes
Mast Clamp	48 ϕ ~ 78 ϕ	34 ϕ ~ 55 ϕ
Cable Requirement	9 conductor	8 conductor
Net Weight	27.5kg	6.5kg
Shipping Weight	30.5 kg	8.7kg

ART-3000C



ART8000 **$478**

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AS210AN 10 el 2m 14.5dB gain	**$49**
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Space 2m ¼wave model 42S, complete with assembly	**$14**
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MARK HELICAL WHIPS (6 ft.)

HW40	40 metres $31	HW20 20 metres	**$31**
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AL48DXN 40/80 metres	**$49**
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JAYBEAM VHF/UHF BEAM ANTENNAS

Model	5Y/2M	8Y/2M	10Y/2M	10XY/2M	18/70	48/70	88/70	D8/70
Type	yagi	yagi	yagi	X yagi	yagi	yagi	yagi	twin
Band	2m	2m	2m	2m	70cm	70cm	70cm	70cm
Gain dBd	7.8	9.5	11.4	11.3	14.9	15.7	18.5	12.3
No. of el	5	8	10	10	18	48	88	2x8
Horiz beam width	58°	47°	37°	38°	28°	26°	19°	45°
Max power	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw
length metres	1.6	2.8	4.4	3.6	2.8	1.83	3.98	1.1
Mass Kg	1.8	3.8	4.5	5.9	3.4	2.7	4.7	2.5
Impedance Ohms	50	50	50	50	50	50	50	50
Price	**$29**	**$35**	**$59**	**$68**	**$59**	**$59**	**$75**	**$48**

count and saying that below this count it is a dot and above this count it is a dash. Further, once we have passed the intermediate count we don't really need to know how long the dash is. That it is NOT A DOT is sufficient definition.

A few other practical points must not be ignored. Firstly, the counter must be made to start at zero each time a new mark is signalled. Then it must be arranged that when the "THIS IS NOT A DOT THEREFORE IT MUST BE A DASH" point has been passed the counter is stopped. This prevents a really long dash causing the counter to cycle round and, at the end of that long dash, stop at a count which falsely indicates a dot. Finally (and perhaps optionally) it is preferable to have the counter ignore VERY short marks not made by the key at the sending end or by noise pulses.

Refer now to Figure 1. The mark counter gate is one section of a 7410 triple three input NAND device. One of the inputs accepts the mark signal from the processor, a second input is fed by NE555 clock pulse generator and the third input is the counter inhibit signal (explained a little later). The pulse chain output of the 7410 goes to a simple binary counter consisting of 7493 A, B and C. The 2^7 output of this counter (pin 11 of 7493C) is low until 127 pulses have been counted through and high thereafter. If this 2^7 counter output is inverted (in one section of a 7402) it will be high from 0-127 pulses and low thereafter. We can use this inverted 2^7 output to enable the input gate from 0-128 pulses received. The 2^5 and 2^6 outputs of the counter are also processed in two more sections of the 7402 so that there is no output at pin 1 of the 7402 for counts between 0 and 31 pulses.

Thus for a clock speed of 1000 Hz and a 20 w.p.m. input dot (or 60 pulses) the following happens:

(i) The rising side of the mark causes 74123(A) to output a short (3-5 micro seconds) positive going pulse which sets the 7493s to a zero count.

(ii) The low on pin 11 of 7493C is inverted and enables the 7410 gate.

(iii) The high of the dot mark also enables the 7410 gate. (Note that (ii) and (iii) must BOTH happen to enable the gate.)

(iv) The counters count pulses but pin 1 of the 7402 stays low until 31 pulses have been counted.

(v) Pin 1 of the 7402 goes high when 32 pulses have been counted and stays high until the 60 pulses representing the dot have been counted.

(vi) Everything stops in this state so that pin 1 of the 7402 is high indicating a dot, but since the count did not go over 60, pin 11 of 7493(C) remains low indicating that the mark was NOT A DASH.

For a dash (equal to 180 pulses at 20 w.p.m. and a 1000 Hz clock) the sequence

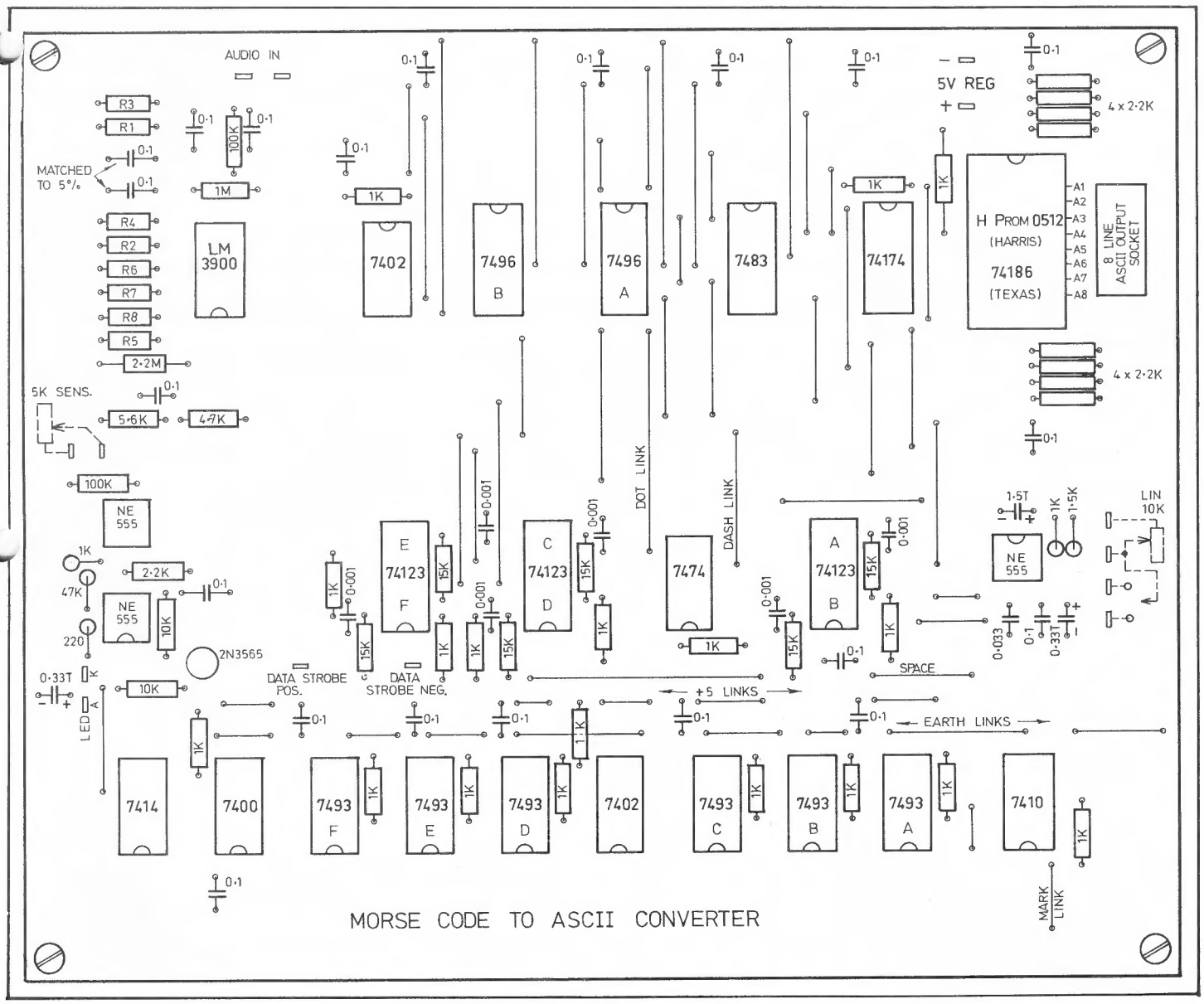

FIG. 2: Circuit Board Layout.

is different. Steps (i) to (iv) occur as for a dot but steps (v) onward change.

(v) Pin 1 of the 7402 is high for 32-127 pulses.

(vi) At the 128th pulse pin 1 of the 7402 goes low.

(vii) At the 128th pulse pin 11 of 7493(C) goes high. This high is inverted and shuts down the input gate.

From this point until the end of the dash (no matter how long that dash is) pin 1 of the 7402 will be low indicating THIS WAS NOT A DOT and pin 11 of 7493(C) will be high indicating THIS WAS A DASH.

Note that without changing the clock speed, the ideal 20 w.p.m. dot can more than halve its speed (double its length) up to the equivalent of 127 clock pulses, or nearly double its speed (halve its length) down to the equivalent of 32 clock pulses, before a false indication occurs.

In practice the clock speed control is adjusted to give a sensible readout and thereafter the speed of the code received can vary within wide limits and/or the formation of the characters can vary before there is lack of differentiation between dots and dashes.

At the end of the mark, therefore, EITHER pin 1 of the 7402 indicates a dot OR pin 11 of 7493(C) indicates a dash. BOTH outputs cannot be high at the same time. However, if the space following the mark is greater than a letter space they can both be low at the same time. These indications are presented to the D inputs of the 7474 dot/dash store.

Consider now the spaces. These are represented by lows from the audio processor. If the output of the processor is inverted (which is done by one 7410 section) then, so far as the space counters are concerned, spaces will now be seen as highs and can be counted in the same way as marks.

There are three sorts of spaces (rather than the two sorts of marks) and these have to be sorted out. The same general thinking can be applied as with marks.

A character space between elements of a letter or figure is one dot long (or 60 pulses at 20 w.p.m. and a 1000 Hz clock) while the space between letters is 3 dots or 180 pulses long. A space between words is 7 dots or 420 pulses long.

Just as with marks we can take the 2^7 output from a binary counter and say that any count under 127 pulses is a character space. However, above 128 pulses counted it might be EITHER a letter space or a word space. Simply to differentiate between LS and WS, the first rise on the 2^7 output can be used to generate a letter space pulse and the second rise on the same output can be used to generate a second letter space pulse. These two pulses will occur at 128 counts and 384 counts. This 384 count is a little short of the ideal 420 count but the shortage has no significant effect.

Whereas the first letter space pulse will clock out a finite letter from the dot/dash registers (see section 4), by the time the

TABLE 1. BANDPASS FILTER CONSTANTS

Bandwidth in Hz at —3 dB Pts.	Q	Voltage Gain	R1/R4 /R6	R2	R3	R7	R5	R8
194	5	7	8.2k	13.62k Use 15k	330 ohms	24.6k Use 22k	16.4k Use 15k	24.6k Use 22k
106	9	9	15k	23.7k Use 22k	172 ohms Use 180 ohms	45k Use 47k	30k Use 33k	22.5k Use 22k
72	14	11	22k	34.2k Use 33k	116 ohms Use 120 ohms	66k Use 68k	44k Use 47k	33k
48	21	14	33k	50.7k Use 51k	77 ohms Use 82 ohms	100k	66k Use 68k	49.5k Use 51k
41	25	15	39k	59.7k Use 62k	65 ohms Use 62 ohms	117k Use 120k	78k Use 82k	58.5k Use 62k

CENTRE FREQUENCY = APPROXIMATELY 1000 Hz.
C1 = C2 = 0.1 mfd polyester or styroseal (NOT CERAMIC) matched to within 2-3%.

TABLE 2.

	MORSE CODE		INTERMEDIATE CODE		ASCII CODE	
	Dot Register	Dash Register	F E D C B A		Y5 Y4 Y3 Y2 Y1 Y0	
A	0 0 0 1 0	0 0 0 0 1	0 0 0 1 0 1	A	0 0 0 0 0 1	
B	0 0 1 1 1	0 1 0 0 0	0 1 0 1 1 0	B	0 0 0 0 1 0	
C	0 0 1 0 1	0 1 0 1 0	0 1 0 1 0 0	C	0 0 0 0 1 1	
D	0 0 0 1 1	0 0 1 0 0	0 0 1 0 1 0	D	0 0 0 1 0 0	
E	0 0 0 0 1	0 0 0 0 0	0 0 0 0 1 0	E	0 0 0 1 0 1	
F	0 1 1 0 1	0 0 0 1 0	0 1 1 1 0 0	F	0 0 0 1 1 0	
G	0 0 0 0 1	0 0 1 1 0	0 0 1 0 0 0	G	0 0 0 1 1 1	
H	0 1 1 1 1	0 0 0 0 0	0 1 1 1 1 0	H	0 0 1 0 0 0	
I	0 0 0 1 1	0 0 0 0 0	0 0 0 1 1 0	I	0 0 1 0 0 1	
J	0 1 0 0 0	0 0 1 1 1	0 1 0 1 1 1	J	0 0 1 0 1 0	
K	0 0 0 1 0	0 0 1 0 1	0 0 1 0 0 1	K	0 0 1 0 1 1	
L	0 1 0 1 1	0 0 1 0 0	0 1 1 0 1 0	L	0 0 1 1 0 0	
M	0 0 0 0 0	0 0 0 1 1	0 0 0 0 1 1	M	0 0 1 1 0 1	
N	0 0 0 0 1	0 0 0 1 0	0 0 0 1 0 0	N	0 0 1 1 1 0	
O	0 0 0 0 0	0 0 1 1 1	0 0 0 1 1 1	O	0 0 1 1 1 1	
P	0 1 0 0 1	0 0 1 1 0	0 1 1 0 0 0	P	0 1 0 0 0 0	
Q	0 0 0 1 0	0 1 1 0 1	0 1 0 0 0 1	Q	0 1 0 0 0 1	
R	0 0 1 0 1	0 0 0 1 0	0 0 1 1 0 0	R	0 1 0 0 1 0	
S	0 0 1 1 1	0 0 0 0 0	0 0 1 1 1 0	S	0 1 0 0 1 1	
T	0 0 0 0 0	0 0 0 0 1	0 0 0 0 0 1	T	0 1 0 1 0 0	
U	0 0 1 1 0	0 0 0 0 1	0 0 1 1 0 1	U	0 1 0 1 0 1	
V	0 1 1 1 0	0 0 0 0 1	0 1 1 1 0 1	V	0 1 0 1 1 0	
W	0 0 1 0 0	0 0 0 1 1	0 0 1 0 1 1	W	0 1 0 1 1 1	
X	0 0 1 1 0	0 1 0 0 1	0 1 0 1 0 1	X	0 1 1 0 0 0	
Y	0 0 1 0 0	0 1 0 1 1	0 1 0 0 1 1	Y	0 1 1 0 0 1	
Z	0 0 0 1 1	0 1 1 0 0	0 1 0 0 1 0	Z	0 1 1 0 1 0	
0	0 0 0 0 0	1 1 1 1 1	0 1 1 1 1 1	0	1 1 0 0 0 0	
1	1 0 0 0 0	0 1 1 1 1	1 0 1 1 1 1	1	1 1 0 0 0 1	
2	1 1 0 0 0	0 0 1 1 1	1 1 0 1 1 1	2	1 1 0 0 1 0	
3	1 1 1 0 0	0 0 0 1 1	1 1 1 0 1 1	3	1 1 0 0 1 1	
4	1 1 1 1 0	0 0 0 0 1	1 1 1 1 0 1	4	1 1 0 1 0 0	
5	1 1 1 1 1	0 0 0 0 0	1 1 1 1 1 0	5	1 1 0 1 0 1	
6	0 1 1 1 1	1 0 0 0 0	1 0 1 1 1 0	6	1 1 0 1 1 0	
7	0 0 1 1 1	1 1 0 0 0	1 0 0 1 1 0	7	1 1 0 1 1 1	
8	0 0 0 1 1	1 1 1 0 0	1 0 0 0 1 0	8	1 1 1 0 0 0	
9	0 0 0 0 1	1 1 1 1 0	1 0 0 0 0 0	9	1 1 1 0 0 1	
.	0 1 0 1 0	1 0 1 0 1	1 0 1 0 0 1	.	1 0 1 1 1 0	
,	0 1 1 0 0	1 0 0 1 1	1 0 1 0 1 1	,	1 0 1 1 0 0	
?	1 0 0 1 1	0 1 1 0 0	1 1 0 0 1 0	?	1 1 1 1 1 1	
/	0 1 1 0 1	1 0 0 1 0	1 0 1 1 0 0	/	1 0 1 1 1 1	
( )	1 0 0 1 0	0 1 1 0 1	1 1 0 0 0 1	,,	1 0 0 0 1 0	
BT	0 1 1 1 0	1 0 0 0 1	1 0 1 1 0 1	-	1 0 1 1 0 1	
AS	1 0 1 1 1	0 1 0 0 0	1 1 0 1 1 0	÷	1 0 0 0 1 1	
KN	0 1 0 0 1	1 0 1 1 0	1 0 1 0 0 0	►	1 1 1 1 1 0	
SK	1 1 0 1 0	0 0 1 0 1	1 1 1 0 0 1	1	0 1 1 1 0 1	
AA	0 1 0 1 0	0 0 1 0 1	0 1 1 0 0 1	:	1 1 1 0 1 0	
AR	1 0 1 0 1	0 1 0 1 0	1 1 0 1 0 0	*	1 0 1 0 1 0	
SP	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0 0	SP	1 0 0 0 0 0	

Table 2 — *Binary* code *information* for the intermediate steps of the conversion from *Morse-to-ASCII.*

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Application	NBFM	NBFM	WBFM	WBFM	WBFM	NBFM	NBFM
Number of Filter Crystals	8	8	8	8	8	4	2
Bandwidth	12.0 kHz	15.0 kHz	30.0 kHz	36.0 kHz	40.0 kHz	14.0 kHz	14.0 kHz
Pass Band Ripple	← ≤ 2 dB →					≤ 1 dB	≤ 2 dB
Insertion Loss	≤ 3.5 dB	≤ 3.5 dB	≤ 4.5 dB	≤ 4.5 dB	≤ 4.5 dB	≤ 3 dB	≤ 1.5 dB
Input-Output Termination Z_t	820 Ω	910 Ω	2000 Ω	2700 Ω	3000 Ω	910 Ω	2500 Ω
Input-Output Termination C_t	25 pF	25 pF	25 pF	25 pF	25 pF	25 pF	
Shape Factor	(70 dB) 2.4	(70 dB) 2.3	(70 dB) 2.2	(70 dB) 1.9	(70 dB) 2.0	(40 dB) 3.0	(20 dB) 3.6
	(90 dB) 2.8	(90 dB) 2.9	(90 dB) 2.7	(90 dB) 2.5	(90 dB) 2.5		(30 dB) 5.7
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2.16	⅝	16	3	No. 3007	**$1.16**
3.08	¾	8	3	No. 3010	**$1.40**
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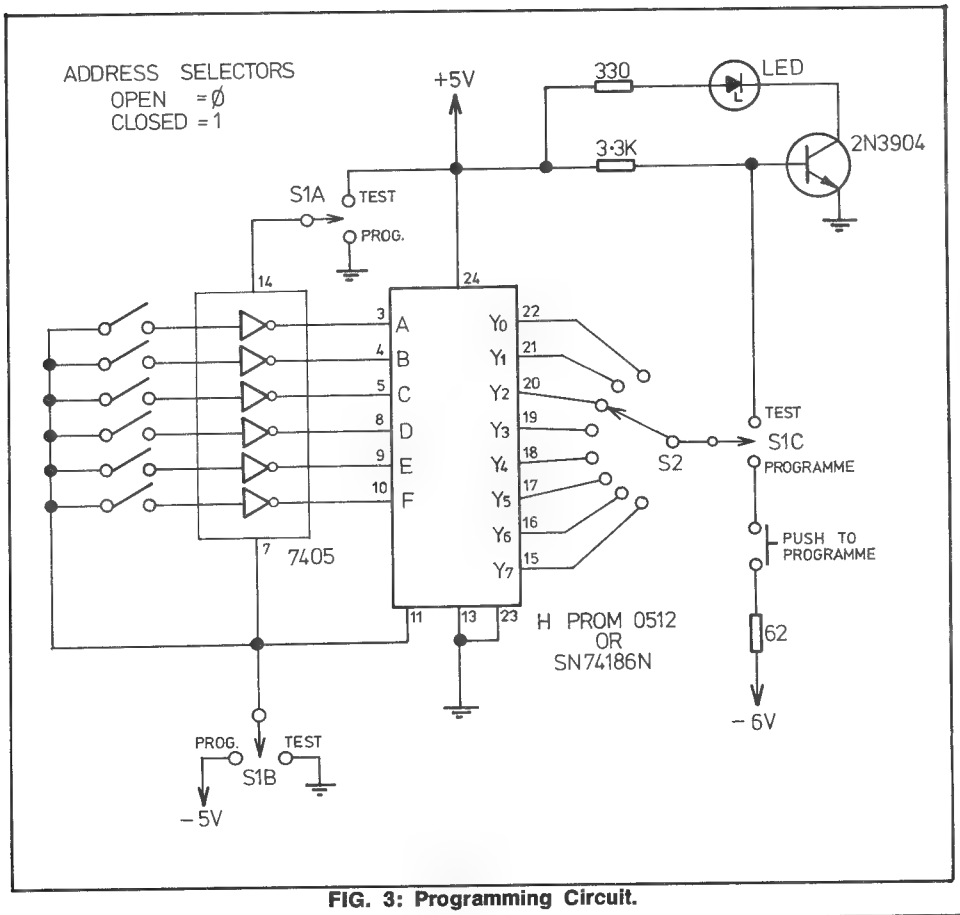


FIG. 3: Programming Circuit.

second pulse comes along these registers will have had their outputs cleared to zero and an "all zero" character, equal to an extra space, will be clocked out.

Provision must be made to stop the space counters recycling if the space is in excess of a WS. To do this the 2^9 output from pin 12 of 7493(F) is inverted and used to disable the 7410 space gate after 511 pulses have been counted.

The character space indication appears to have been ignored. In fact it is generated by 74123(C). Just as with the mark counters we need to zero the space counters at the start of a space. But since the end of a mark is the same point in time as the start of a space, the space counter rest pulse can be used to indicate that a mark character has finished and that the element that is in the 7474 mark store can be clocked out into the dot/dash registers. In practice 74123(B) zeros the space counter and 74123(C) is triggered by this zeroing pulse so that clocking through the mark information on the 7474 is delayed by 3-5 micro seconds.

Returning to the generation of LS and WS, the 2^7 output (pin 8 of 7493F) is inverted. This inverted line will now be high from 0-127, low from 128-255, high again from 256-383 and low from 384 until the counter is stopped at 511.

The two high to low transitions at 128 and 384 are used to trigger 74123(E) whose positive going output pulse is used to clock the dot/dash registers and also

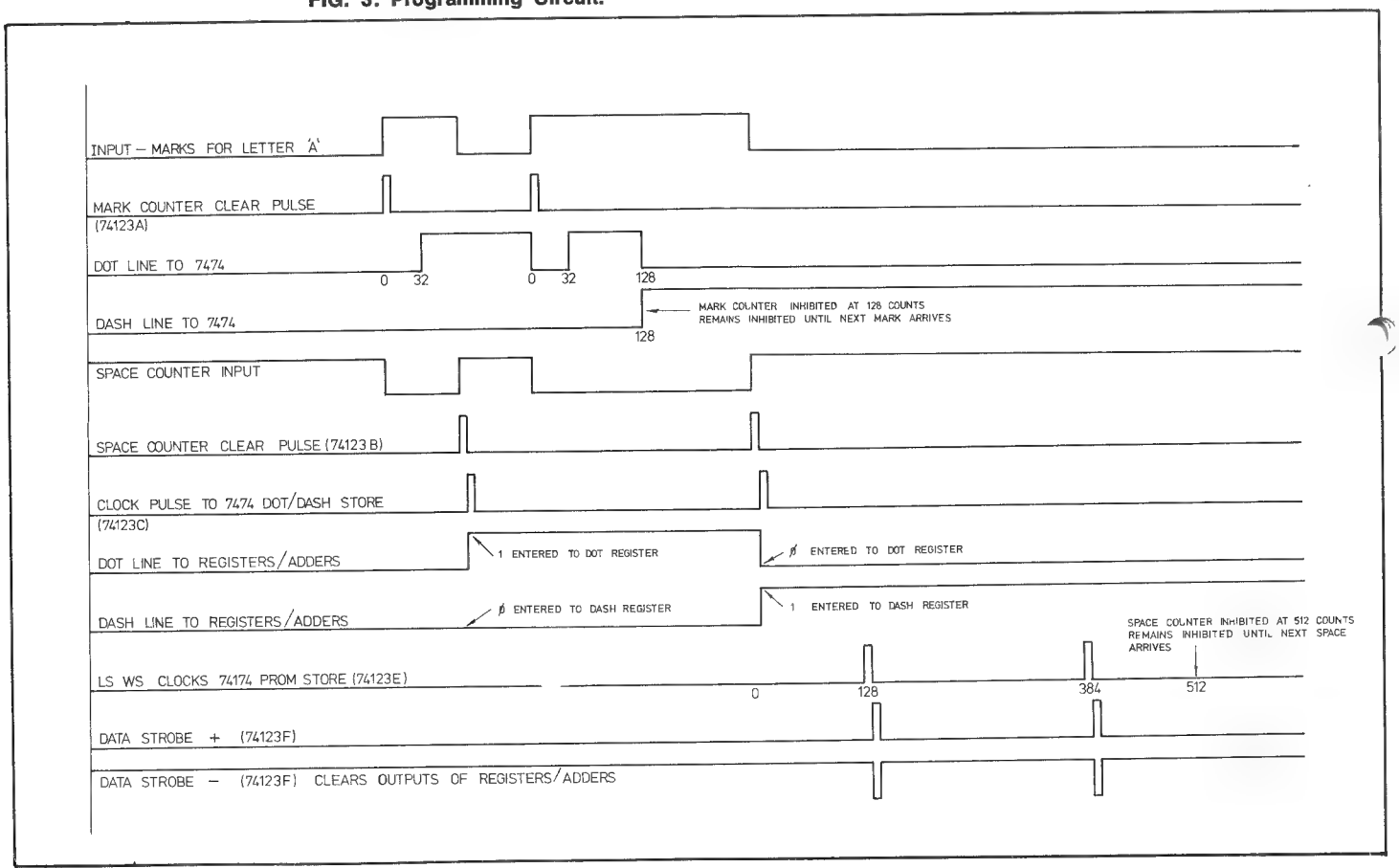


FIG. 4: Waveforms.

to trigger 74123(F) some 3-5 micro seconds later.

The negative going pulse from pin 4 74123(F) is used (a) to clear the dot/dash reg sters and (b) to provide a negative going data stroke or KP. Pin 13 of 74123(F) generates an alternate positive going data stroke or KP (key pressed). This provision is made because some VDUs require a negative going key press (or character valid) signal while others require a positive going key press signal.

3. STORAGE AND CONVERSION

At the end of every mark there remains on the inputs of the 7474 dot/dash store EITHER a dot indication OR a dash indication. Section 2 showed how, as soon as the mark finished, and the space started, this information was clocked through the 7474 by a pulse from 74123(C).

If the mark was a dot it is presented to 7496(A) and if a dash to 7496(B). These two devices are 5 bit shift registers. Once the information has been presented to these registers a short positive going pulse on their clock inputs causes the data to shift over one place. The pulse used for clocking comes from 74123(D) which section 2 showed was generated slightly after a mark was finished. Note that if a 1 is clocked into the dot register then a 0 must be clocked into the dash register and vice versa. If the letter Z is received the first element (a dash) is clocked into the dash register as a 1, while a 0 is clocked into the dot register. The second dash of the Z clocks another 1 into the dash register and another 0 into the dot register. The first and second dots of the Z clocks 1s into the dot register and 0s into the dash register. When the letter has been completed the dot register will contain (for a R to L shift) 00011 while the dash register will contain 01100. At this point the two registers contain a unique 10 bit representation of the letter Z.

If we had a 10 bit code changing device we could use this 10 bit code directly and have the capability to generate 1024 different and unique characters. Since in normal use we only require 26 letters, 10 figures and a few "specials" such as AR, SK, full stop, quotation mark, etc., we would be paying for a lot of unused capacity. Reduction of the 10 bit intermediate code to a 6 bit intermediate code allows the use of 2^6 or 64 character capacity — much more in keeping with the 40-45 character capacity really needed. It is also much less expensive.

The 10 bit to 6 bit reduction is done using a 7483 four bit adder and two sections of a 7402 NOR gate. In effect, the contents of the dot register are multiplied by two and added to the contents of the dash register to give a 6 bit code which is still unique for the intended range of characters.

The 6 bit code is presented to the inputs of a 74174 memory store. When a letter or figure is completed the outputs of the registers and adders (which now contains the intermediate six bit code for the character received) are clocked through to the 74186 PROM by the LS pulse emanating from 74123(E). Having presented this information to the PROM, the dot/dash registers are cleared to zero. The inputs of the 74174 also become zero at this point. However, the 74174 outputs retain the information representing the last character while the previous part of the circuitry is occupied detecting the next one. This output information will not change until the next character is signalled as complete.

It may now be more readily understood how the second LS pulse can cause an "all zero" or "word space" to be put out to the code changing device.

The final step in the conversion process is to change the intermediate 6 bit code to the ASCII code which will be recognised by the VDU logic. To do this a PROM is used. In brief, a PROM is a Programmed Read Only Memory. It consists of a device having several inputs and several outputs. The number of inputs represents the number of unique binary codes that can be presented to the device. The 74186 (or H PROM 0512) used in this design has 6 input lines which can represent $2^6 = 64$ different combinations of 1s and 0s from 000000 through to 111111. Each of these 64 binary numbers is known as a word address.

The 74186 also has eight output lines so that each unique input address can generate a separate — and also unique — output of 8 bits. Each 8 bit output is known as an 8 bit word.

As manufactured, the 74186 comes unprogrammed and whatever the input address all the outputs remains as 0s. Programming consists of blowing small nichrome fuses in the PROM so that 1s appear on the output lines where required.

To decide where output 1s are required a truth table must be constructed. The inputs to this truth table are the patterns of 1s and 0s generated by the converter logic while the outputs are those required by the ASCII code.

Table 2 summarises all this data giving the letter, figure or group, the dot and dash register contents at the end of each character, the 6 bit intermediate code corresponding to each character and the ASCII output from the PROM needed for each character. The last two columns represent the truth table required to programme the PROM.

Programming must be done external to the converter. The circuitry required is shown in Figure 3. Once used this circuit will no longer be required. Three voltage levels are required, +5.0 volts regulated, —5.0 volts regulated and —6 volts. This latter supply can conveniently be a dry cell.

Programming is done as follows:

1. For each word, the input code from the truth table is set up on the six input address switches. A closed switch is equal to a 1 and an open switch is equal to a 0.
2. The output selector switch is set to the least significant of the outputs requiring a 1 (starting at the Yo end).
3. The test/programme switch is set to programme.
4. The programme push button is depressed and released.
5. The test/programme switch is set to test. If a 1 has been programmed the LED will light.

This procedure is repeated at each output position where a 1 is required by the word being programmed.

The input address is then changed to the next word and each of the output lines programmed where a 1 is required.

The process is not difficult but does require complete concentration. If a mistake is made IT CANNOT BE UNDONE. To make an error in the 40th of 50 words does not make anyone's day!

In this particular design there is a *little* latitude for mistake making since only output lines 1-6 are used. If an error is made on one of output lines 1-5 then output line 7 or 8 can be programmed instead and suitable changes made in the connecting cable to the VDU. Six from eight leaves 2, which is the total number of mistakes allowed!

CONSTRUCTION AND TESTING

Given a proven circuit board, construction consists simply of putting the components and links in place as indicated by the layout diagram.

The usual care should be exercised to ensure that the ICs are properly oriented and that no small solder bridges remain between pins or tracks. These two sources of error cover 90 per cent of the reasons for incorrect operation.

A 24 pin socket is used for the PROM but (unless the extra cost of sockets and the higher probability of poor contacts is not considered a problem) it is recommended that all other ICs be soldered directly into the board.

With +5 volts applied the unit should draw around 650 mA. Significantly greater current than this indicates a fault (IC wrong way round and/or solder bridges again the most likely reasons). If the current drawn is in the right area the unit may be connected to a VDU and audio applied from the station Rx.

In the absence of any signal, back off the sensitivity control until the LED just stops blinking with background noise. Then tune into a morse signal when the LED should light on dots and dashes. Some care in tuning will be called for since the filter is only around 70 Hz wide. At this stage there should be some indication of activity on the VDU screen. Now adjust the speed control until sensible text appears on the screen.

One point to watch is in the VDU logic itself. Most designs assume that a carriage return and a line feed will be sent along with the text proper. This is indeed the case with RTTY but is not so with morse. Provision will, therefore, have to be made

within the VDU logic to return the text to the LHS of the screen (carriage return) and to start on the next line down (line feed) when copying morse. Just how this can be done depends on the VDU logic being used but, in general, gating must be added which allow EITHER internally generated LF/CR pulses OR manually generated external LF/CR pulses to be used.

The author will be pleased to answer queries, either technical or with respect to parts procurement. For written queries the inclusion of a stamped, self-addressed envelope will ensure a reply. Arrangements are being made to provide a source of PCBs and to organise a programming service for the PROM.

AX4HRH ON AIR

Alex McDonald VK4TE
35 Salford St., Salisbury, Qld. 4107

It was late last year that the first thoughts on a Special Commemorative Amateur Radio Station during the March 1977 Royal Visit to Brisbane, came to mind. We had previously been advised that all VK amateur stations would be allowed the use of the AX prefix on the occasion of the Royal Visit to Australia, and what better way to use the prefix than to establish a special station to be in operation during the visit to Brisbane.

The idea was placed before the January meeting of the VK4 Council, and after discussion on the matter including the possibility of applying for the distinctive call sign AX4HRH, I was empowered to investigate the feasibility of the suggested project.

The next day I spoke to the Under Secretary of the Premier's Department. He seemed quite receptive to the idea and suggested we put our ideas on paper so they could be considered.

At this stage, the plan was to set up a station in a quiet corner of one of the permanent buildings on the site of the Nathan Sports Centre. This seemed the Ideal location as the complex is high, on the side of a hill and in a quiet location.

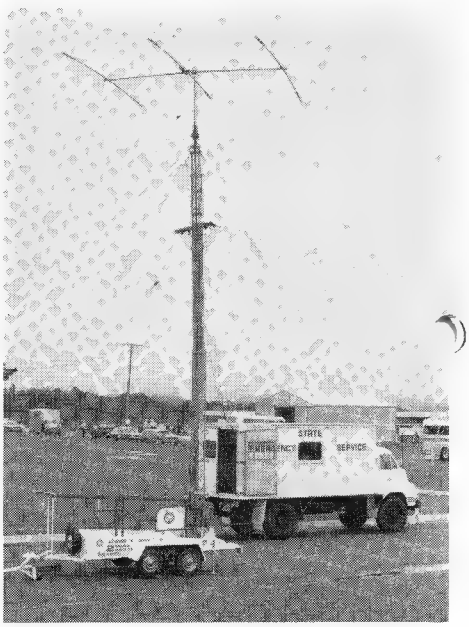
A secondary schools sports day was planned for the 10th of March, and the Royal Party was due to arrive in the early afternoon and, after naming the complex "The Queen Elizabeth II Jubilee Sports Centre", final track events were to be run and the winners presented their prizes by the Royal Couple.

Plans proceeded quite smoothly. Federal Executive was asked to approach the P. and T. Department regarding the allocation of AX4HRH for the station, and it was suggested that other divisions could also be interested in the call sign for their States' use.

Unfortunately, it was found that there were very few permanent buildings at the complex and none with quiet corners where we could establish a station. However, after a site inspection with the complex manager, we were allocated an area handy to a power pole and given approval to erect a tower to support a beam.

The State Emergency Service offered every assistance, and the decision was made to set up the station utilizing both HF and VHF in the back of a 3-ton covered S.E.S. truck.

Calls for operators and equipment were broadcast over VK4WIA Sunday news service and as the day approached, everything was progressing smoothly. We had sufficient equipment and operators and plans were made to be operational from about 0000Z to 0530Z on the 10th March 1977. News of the special station was spread around, and I understand it was also broadcast over the other divisions' news services.



Installation at AX4HRH.

Alex VK4TE (l.) and Bob VK4RN (r.) prepare the beam.

The only delay in the final planning was the uncertainty of the allocation of the special call sign and rules under which the station could operate. However, approval was received, the call sign AX?HRH reserved for all States, and rules released.

At this point of time, it was almost decided to forget the whole scheme. The rules, as explained to me, meant it would be a waste of time and effort to establish the station. However, after several more phone calls, the rules were clarified and the operation proceeded again.

Unfortunately the weather on the 10th was not in our favour. Whilst setting up the aerials, we found a few problems (which always happens), the SO-239 in the balun for the tri-band yagi would not tighten, the SWR on the 40 metre inverted vee wouldn't come down, and the PL 259 on the VHF cable fell off. (MURPHY'S LAW?—Ed.) ■

Consequently it all took time to fix, and by the time we were almost ready to go, we were soaked to the skin as it had been raining steadily since about 6.00 a.m. Final adjustments to the inverted vee were made about 10.30 a.m. and the weather started to clear.

Our first contact was logged at 0108Z on VHF, and we soon followed on HF. We had planned to operate on 40 and 20 at the same time, as well as on 2, but soon found only one HF set could operate at a time, so HF operating time was shared between 40 and 20.

Activity on 2 was a bit light on, but it was an excellent site with easy access to several repeaters. 40 and 20 were both in great shape, and Mervyn VK4SO operating on 40 was very pleased with the reports he was receiving.

Operations continued during the day and by lunch time quite a number of contacts had been made. It was decided to operate 40 and 20 alternately for periods of about 15 minutes.

By the time the Royal Party was due to arrive, it had started to sprinkle, but the sports events continued.

The Royal Party arrived in a closed car but changed to a Land Rover for the circuit of the oval.

By 0530Z, the rain had set in and we were in for another soaking during dismantling operations. However, it did not take as long to dismantle AX4HRH as it had to set up. The last contact, a CW contact, was made at 0620Z.

AX4HRH was a great success. Several DX contacts were made including Norfolk Island, New Zealand and Japan. All States except VK6 and VK8 were worked.

Bands operated: 40, 20, 15, 2.

Modes: CW, SSB, FM.

Contacts: 98.

Special thanks are due to VK4QN, VK4ZSH, AWA and SES for loans of equipment.

VK4SO, VK4ZLP — Operators.

VK4SO, VK4ZPF — Camera work. ■

YOUR BEAM: WILL IT STAY UP?

Reprinted from
Geelong Amateur Radio Club
July 1977 Newsletter

Quite often we hear of a beam antenna that withstands several severe storms and then tumbles down in a comparatively light breeze. This generally baffles the builder, but a close examination will disclose that some of the fundamental rules in the use of metals have been violated.

Nearly everyone is familiar with the fact that iron and steel will rust readily on exposure to the weather, so proper steps are usually taken to prevent corrosion either by painting or applying a protective coating of some metal. Few however realise that under certain conditions other metals, for instance aluminium, may become badly corroded.

In the case of our broken down beam, we find that the tubular aluminium elements have been bolted together with steel or brass crews and nuts, brass being used to prevent the formation of rust. Amateurs are not alone in this. Commercial TV antennas, including rotators, fall into the same error and may be expected to give trouble. At each of these joints the aluminium has been badly corroded and finally weakened to such an extent that the light breeze caused failure.

Why is this condition bad and what can be done to overcome it? Let's go back to our school chemistry or maybe the days when we used wet batteries to operate a doorbell or buzzer. Those wet batteries used two dissimilar metals, usually zinc and copper, immersed in a conducting solution or electrolyte, such as one containing copper sulphate. The combination gave an EMF of something over one volt and as we used the battery the zinc was gradually used up or corroded while the copper was unattacked. The zinc was the negative terminal and the copper positive.

The same thing happens in the dry cells and in this case the carbon rod is unaffected. In like manner, any two dissimilar metals in contact with each other in the presence of an electrolyte will form a small galvanic cell and the more negative metal will be attacked or corroded. All metals can be arranged in a series according to the individual potential attributed to each. The EMF developed by any particular couple or combination is the sum of the potentials of the two metals. The greater this EMF the greater the tendency toward corrosion. The table shows the electrochemical series for the more common metals and the potential of each. In outdoor exposure, the required electrolyte is supplied by atmospheric humidity or rain. Industrial and urban atmospheres contain small amounts of sulphur dioxide from fuel combustion which will slightly acidify the moisture. Marine atmosphere contains salts which will provide the necessary conducting electrolyte.

Reference to the table shows that aluminium and copper (brass is an alloy of copper) are far apart, and considerable galvanic corrosion can take place in moist atmospheres when these metals are in contact with one another. The combination will show that aluminium is the most negative of the combination and will be attacked with resulting loss of strength. The table will suggest other poor combinations but aluminium and copper is one of the worst offenders. What can be done to guard against this condition? If you live near the coast all possible protective measures should be used. For a dry inland climate, the danger is not as great and less stringent measures will be satisfactory.

The screws, bolts and nuts can be made of steel with a more protective coating such as zinc plate, or galvanized coating. Cadmium or nickel plate can also be used as can stainless steel hardware. All of these are much better than brass, but still not entirely preventive.

As a final precaution the joint should be painted to keep out moisture and the electrolyte required for corrosion. Here again the degree of protection required dictates the materials used. For highest protection a first coat of zinc chromate primer should be used followed by one or more coats of good outside paint.

The zinc chromate, besides serving as a prime coat, also provides a "passivating" action to aid further in corrosion protection. For less severe climates the outside paint alone may be used. Another fact not generally known is that stainless steel is not corrosion resistant unless it had a good polished surface. If dirt or scale is present electrolytes can go to work and readily start destructive corrosion

It is hoped that these few simple rules of the materials engineer may help to keep more antennas in the air and more amateurs on the ground. ■

TABLE OF CORROSION POTENTIAL

Magnesium	+2.34V	Nickel	+0.25V
Aluminium	+1.67V	Tin	+0.14V
Zinc	+0.76V	Lead	+0.13V
Chromium	+0.71V	Copper	—0.34V
Iron	+0.44V	Silver	—0.80V
Cadmium	+0.40V	Gold	—1.68V

QSP

USA BUDGET SQUEEZE

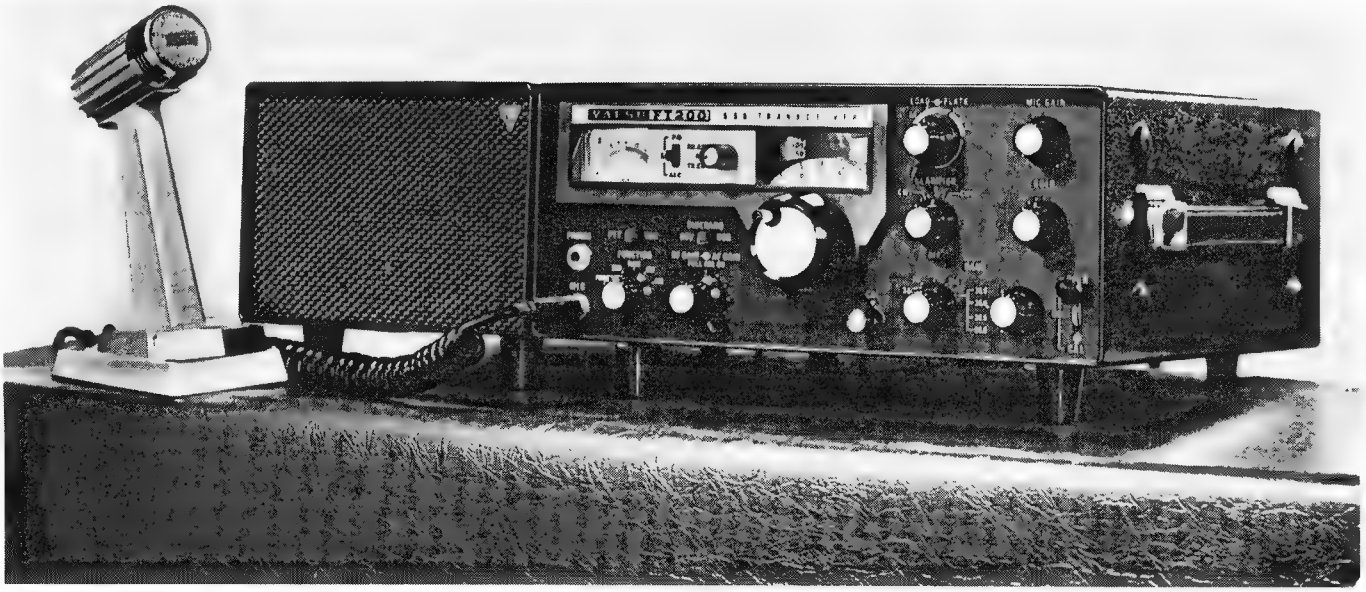
The editorial in June '77 CQ has a familiar ring to it. "The number of U.S. amateurs", is says, "is increasing at a tremendous rate with a record growth predicted. The downward slump has been eradicated with a monumental surge of interest shown in amateur radio. The bad news is that due to this great surge of interest the FCC is seriously considering phasing out the Novice class licence and thereby, in our opinion, sounding the death knell for amateur radio. The FCC claims that it is squeezed in a budget crunch and one of the 'expendables' or things 'they can afford to eliminate' is the Novice". The editorial points out that if this did eventuate there would be a corresponding surge of interest in the next grade up the scale, and so on.

JOTA

A reminder about the 20th Jamboree-on-the-air over the week-end 15-16 October 1977.

FT-200 FIVE BAND TRANSCEIVER

ECONOMICAL SSB! from YAESU



GENERAL DESCRIPTION

A superb quality, low cost, versatile Khz transceiver. Covers 80-10 mx, tuning range 500 Khz each band. On 10 mx, crystal supplied for 28.5-29 Mhz. (Crystals available optional extra for full 10 mx coverage.) SSB, CW, AM; with a speech peak input of 300w. Transistorised VFO, voltage regulator, and calibrator, 16 valves, 12 diodes, 6 transistors. PA two 6JS6C pentodes. ALC, AGC, ANL, PTT and VOX. Calibrated metering for PA cathode current, relative power output, and receiver S units. Offset tuning ±5 Khz. Uses a 9 Mhz crystal filter with bandwidth of 2.3 Khz at —6 db. Selectable sidebands.

Provision for use of optional external VFO, FV-200 VFO includes fixed channel facility.

Operates from conservatively rated separate 234 volt 50 Hz AC power supply, FP-200, which includes built-in speaker. Transceiver incorporates power take-off and low level R.F. drive outlets suitable for transverters.

Cabinet and panel finished in black.
If required for novice use, the power can be easily reduced. If a separate external crystal oscillator (not supplied) is used then fixed C.C. transmit operation would be possible, with tunable reception.

Hand Held or Desk Mic. Optional Extra.

TECHNICAL DATA

Mode of Operation:	**SSB (A3J), Phone (A3H), CW.**
Frequency Range:	**3.5 ~ 4.0, 7.0 ~ 7.5, 14.0 ~ 14.5, 21.0 ~ 21.5, (28.0 ~ 28.5), 28.5 ~ 29.0, (29.0 ~ 29.5), (29.5 ~ 30.0 Mhz).**
Frequency Stability:	**After Warm-up, 100 CPS/30 Min.**
Spurious Response:	**Better than — 40 db.**
Antenna Impedence:	**50 ~ 100 Ω Unbalanced.**
Carrier Suppression:	**Better than —40 db.**
Side Band Suppression:	**—50 db at 1000 CPS.**
3 RD Harmonic Inter-modulation Distortion:	**—30 db (P.E.P.)**
Transmission Bandwidth:	**3 Khz.**
Receive Sensitivity:	**0.5 μV S/N 10 db.**
Filter Selectivity:	**2.3 Khz (—6 db) 4 Khz (—60 db).**
I.F. Mixing Beats:	**50 db Down.**
Image Interference:	**50 db Down.**
AGC Characteristic:	**Amplified AGC.**
Receiver Output Power:	**1W (at 10% Distortion).**
Weight:	**17.6 lbs.**
Dimensions:	**13¼" Wide, 5½" High, 11" Deep.**

Price, including sales tax, excluding freight:
FT-200, including FP-200 Power Supply — $588.00
FV-200 — $139.00
Prices and specifications subject to change.

JAS7778-17

bail **ELECTRONIC SERVICES**

FRED BAIL VK3YS
JIM BAIL VK3ABA

60 Shannon St., Box Hill North, Vic., 3129.
Ph. 89 2213

Radio amateur equipment from B.E.S. also sold by:

W.A.	Radio Communication Services H. R. PRIDE, 26 Lockhart St Como. 6152	Ph. 60 4379
	WILLIS TRADING CO., 429 Murray Street Perth 6000	Ph. 21 7609
S.A.	FARMERS RADIO PTY. LTD., 20 Stanley St., Plympton. 5038	Ph. 293 2155
TAS.	G. T. ELECTRONICS, 131 Westbury Rd., South Launceston. 7200	Ph. 44 4773
	PRINS RADIO, 123 Argyle Street, Hobart 7000	Ph. 34 6912
N.S.W.	Aviation Tooling, STEPHEN KUHL, 104 Robey St., Mascot. 2020	Ph. 667 1650 AH 371 5445
	Amateur & Novice Comm. Supplies, W. E. BRODIE, 23 Dalray Street, Seven Hills 2147	Ph. 624 2691
	DIGITRONICS, 186 Parry St., Newcastle West. 2302	Ph. 69 2040
QLD	H. C. BARLOW, 92 Charles St., Aitkenvale, Townsville, 4814	Ph. 79 8179
	MITCHELL RADIO CO., 59 Albion Rd., Albion, 4010	Ph. 57 6830
A.C.T.	QUICKTRONIC, Jim Bland, Shop 11, Altree Crt., Phillip, 2606	Ph. 81 2824 82 2864

ELECTRONIC ENTHUSIASTS EMPORIUM

POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	4 60	CD4026	3.30	CD4724	3.85	LM380N	2.75	MC1496K	2.75	UAA180	3.25
CA3013	5 80	CD4027	1.05	CD40097	1.80	LM381N	3 20	MC1590G	6.75	UA723C	LM723
CA3018	3.50	CD4028	1 80	CD40098	1.80	LM382N	2 60	MC14553	12.50	UA757	3 80
CA3023	6 80	CD4029	2.65	CD40174	2.90	LM387N	2.75	MC1648P	4.90	ULN2208	2.45
CA3028A	2.60	CD4030	.95	CD40175	2 90	LM395K	6.90	MC4044P	4 90	ULN2209	2.45
CA3035	5 20	CD4031	4 70	CD40192	2 90	LM555CN	1.20	OM802	3 20	ULN2111	2.10
CA3039	2.10	CD4035	2 35	CD40194	2 90	LM555H	1.95	SAJ110	2.50	74C00	.55
CA3046	LM3046	CD4040	2.50	CD40195	2.90	LM556N	2.95	SAK140	2.50	74C02	.80
CA3053	1.70	CD4041	2.50	DM8097	1 90	LM562B	10.90	SD305DE	1.30	74C04	.55
CA3059	8.40	CD4042	1 95	HEF see	"CD"	LM565N	3.50	SD306DE	1.50	74C10	.65
CA3060	8.40	CD4043	2.25	LH0070	6 20	LM566CN	2.50	SL415A	2 70	74C14	2.80
CA3079	4.40	CD4044	2 25	LM114H	4 90	LM567CN	3 50	SD425A	1.80	74C20	.75
CA3080	2.10	CD4045	3 20	LM301AN	.95	LM709N	.95	SL437D	3.60	74C85	3.90
CA3081	2.70	CD4046	3.20	LM301CN	.95	LM710CN	1.25	SL440	1.90	74C86	2.00
CA3082	2 70	CD4047	1.95	LM304H	3.80	LM710CH		SL442	2 90	74C90	2 50
CA3083	2 90	CD4049	.90	LM305AH	3 80	LM723H	1.70	SL447	4.90	74C154	5 70
CA3086	LM3086	CD4050	.90	LM307N	1 60	LM723N	1.25	SL449	1.60	74C160	3.60
CA3089E	2 90	CD4051	2 25	LM308V	2.20	LM725N	5.90	SL610C	7.25	74C162	4.50
CA3090Q	6 90	CD4052	2 25	LM309K	2.60	LM733CH	2.70	SL612C	7.25	74C174	2.50
CA3091	18 00	CD4053	2 25	LM310N	3 90	LM733N	2 50	SL613C	12 50	74C192	2.80
CA3120E	4.50	CD4066	1.45	LM311A	3 60	LM741CH	1.20	SL620C	9.50	74C901	1.95
CA3127E	4 50	CD4068	.55	LM311H	3 60	LM741CN	.75	SL621C	9.50	74C925	16.70
CA3128E	9 90	CD4069	.60	LM312H	4 90	LM747CH	2.70	SL623C	17.40	80C95	2 20
CA3130T	2.25	CD4070	.55	LM317K	6 90	LM747CN	2.50	SL622C	26 90	**MISC**	
CA3140T	2.25	CD4071	.55	LM318N	5 90	LM748CN	1 20	SL624C	8.80	AL5352	1.50
CA3600	3 30	CD4072	.55	LM319H	7.25	LM1303N	2 60	SL630C	6 90	GL4484	1.80
CD4000	.55	CD4075	.55	LM319N	5.90	LM1310N	3 50	SL640C	10.60	GL5253	.90
CD4001	55	CD4076	1 25	LM320K	6.90	LM1458N	2 50	SL641C	10 60	OL31	.90
CD4002	55	CD4078	.55	LM320T	4 50	LM1488N	6 90	SL645C	12 60	RL4484	.39
CD4006	2 30	CD4081	55	LM322N	4 50	LM1489N	5.75	SL901B	3 90	RL5023	.35
CD4007	55	CD4082	.55	LM323K	7 90	LM1496N	1.90	SL917B	6 50	FND357	3.50
CD4008	2 35	CD4085	1 65	LM324N	4 50	LM1808N	3 90	SL1310	1 60	FND500	3.50
CD4009	1 50	CD4086	1 65	LM325N	4.50	LM3028	CA3028	SL3046	1.20	9001	1.80
CD4010	1.50	CD4093	1.80	LM326H	4 50	LM3046	3.60	SP8505	8.60	9368	3 85
CD4011	.55	CD4502	2 70	LM339N	3.70	LM3086	3.75	SP8515	12.90	9601	2.90
CD4012	.55	CD4503	1 40	LM340K	4 95	LM3900	1 75	TAA300	2 90	NSN71	2 90
CD4013	.90	CD4510	3.20	LM340T	2.70	LM3905	3 90	TBA570	2.90	NSN74	2.90
CD4014	2.40	CD4511	3 30	LM349N	4 50	LM3909	1 50	TBA700	4.90	TIL306A	
CD4015	2 40	CD4514	6 50	LM358N	3 20	MC1035P	2 90	TBA810A	4.90	11C90	18 50
CD4016	.90	CD4515	6.50	LM370H	4.95	MC1312P	4.80	TB1750A	3 90	95H90	14 50
CD4017	2 25	CD4516	3.20	LM371N	3 90	MC1314P	6 90	TCA220	2 25	2102-2	3 75
CD4018	2 25	CD4518	2 85	LM372H	7.50	MC1315P	10 75	TCA290A	4.90	2513N	17 50
CD4019	2 25	CD4519	1 35	LM372N	4 50	MC1350P	1.95	TCA420A	4.90	S1883	
CD4020	2 50	CD4520	2 55	LM373N	4 70	MC1351P	3 60	TCA580	6.50	S50242	15 00
CD4021	2 25	CD4528	1.80	LM374N	4 90	MC1454G	5.40	TCA730	6 90	MA1002	13 50
CD4022	2 15	CD4539	1 98	LM375N	4.90	MC1458	LM1458	TCA740	6 80	7805CP	2.90
CD4023	.55	CD4555	1 80	LM377N	3 50	MC1468L	6.50	TDA1005	5 50	7824CP	
CD4024	1 75	CD4556	1 80	LM379	7.50	MC1488	LM1488	UAA170	3 25		
CD4025	.55	CD4720	12 60								

In some cases pin for pin substitutes will be supplied.

POPULAR SEMI-CONDUCTORS STOCKED

7400	.48	7483	2 30	74S258	4.75	74LS174	2.70	BD238	1.80	2N3566	.95
7401	.48	7485	2 95	74S196	7.50	74LS175	2.70	BD437	2 80	2N3568	.95
7402	.48	7486	.85	82S23	6.95	74LS181	6.50	BD438	2.80	2N3569	.50
7403	48	7489	4 50	8281A	3 90	74LS191	4.50	BF173	1.25	2N3638	.55
7404	.48	7490	90	82S90	7.50	74LS192	4.50	BF180	1 20	2N3638A	.60
7405	.48	7491	1 90	74LS00	.55	74LS193	4.50	BF194	.85	2N3642	.55
7406	1.09	7492	1 20	74LS01	.55	74LS194	2.60	BF200	1.30	2N3643	.55
7407	1.09	7493	1.20	74LS02	.55	74LS195	2 60	BFY50	1.20	2N3694	.65
7408	1 09	7494	2.20	74LS03	.55	74LS196	2.60	BFY51	1.50	2N3731	5 95
7409	.48	7495	1 65	74LS04	65	74LS221	2.50	BPX25	4 90	2N3819	1 35
7410	.48	7496	2 15	74LS08	.55	74LS253	2.75	BSX19	75	2N3866	2.75
7411	.54	74100	3 65	74LS09	.55	**SEMICONDS**		BU126	3.85	2N4037	1.25
7413	1 15	74107	.95	74LS10	.60	AC125	1.80	MFE131	1.95	2N4249	.65
7414	2.70	74121	1 20	74LS11	55	AC126	1.80	MJ802	8 90	2N4250	.65
7416	1.00	74122	1.20	74LS13	1.20	AC127	1.80	MJ2955	2 60	2N4355	.65
7417	1 15	74123	1 40	74LS14	2.95	AC128	1.80	MJ4502	8 90	2N4356	.65
7420	.48	74132	1 90	74LS20	55	AC132	1.50	MPF102	.65	2N4360	.95
7422	1 95	74141	2 75	74LS21	55	AC187	1.50	MPF103	.85	2N5245	.75
7425	.95	74145	2 95	74LS22		AC188	1.50	MPF104	1.10	2N5457	MPF103
7426	.70	74150	3 25	74LS27	.60	AD149	2 60	MPF105	.65	2N5458	MPF104
7427	.66	74151	2.20	74LS28	.60	AD161/62	4.50	MPF106	1.15	2N5459	MPF105
7430	48	74153	1.95	74LS30	55	AS322	.18	MPF121	1.60	2N5485	MPF106
7432	.66	74154	3 20	74LS32	.70	AT1138	2N301	MPF603	6.90	2N5590	MPF603
7437	.90	74157	2 20	74LS37	.70	ASY17	2 65	TIP31C	1.20	2N5591	11 30
7438	90	74160	2 75	74LS38	70	BC107	.35	TIP32C	1.30	2N6027	1.35
7440	48	74164	2 90	74LS40	.65	BC108	.35	TIP120	3.20	2N6084	21.00
7441	2 80	74165	2 90	74LS42	2.20	BC109	.35	TIP125	3 30	BA102	.80
7442	2.60	74174	2 90	74LS73	.75	BC177	.40	TIP141	4 70	OA47	.60
7445	2 60	74180	2 90	74LS74	90	BC178	.40	TIP2955	1.70	OA90	.35
7446	2 60	74181	5 95	74LS75	1.20	BC179	40	TIP3055	1 70	OA91	35
7447	2 60	74185	4 90	74LS78	75	BC182	.40	TT800	2N4037	5082-2800	3 20
7448	2.60	74190	3 20	74LS86	95	BC212	.50	TT801	1 20	40440	2N3731
7450	48	74177	2 90	74LS90	1 95	BC327	.55	2N301	2N2869	40637A	2 85
7451	.48	74191	2.90	74LS92	1.95	BC337	.55	2N706A	1 20	40673	1.95
7453	48	74192	2 75	74LS93	1 95	BC547	.55	2N918	1.60	40822	2.90
7454	.48	74193	2 75	74LS95	2 60	BC548	.55	2N2222A	1.20	40841	1.90
7460	.48	74194	2 50	74LS109	85	BC549C	.55	2N2646	2 50	BZX61	.75
7470	85	74195	1 90	74LS113	85	BC559	55	2N2869	2 70	BZX79	.42
7472	75	74196	2 90	74LS114	85	BC639	1.20	2N2904A	1 50	BZX70	1 50
7473	80	74S00	1 50	74LS151	2.60	BC640	1.20	2N2905	1 20	BZY93	2.60
7474	.95	74S10	1 75	74LS153		BD131	1 20	2N3053	1.20	BZY91	12.50
7475	1 35	74S20	1 75	74LS157	2.40	BD132	1 60	2N3054	1.70	PA40	5 85
7476	90	74S74	3 50	74LS163	3.95	BD139	1 20	2N3055	1 35	PB60	6 50
7480	1.60	74S112	3 20	74LS163	3.95	BD140	1.20	2N3564	65	MEL12	1.40
7482	2.30	74S251	5 30	75LS164	2 90	BD237	1.80	2N3565	.55	FCD820	1 90

PC BOARD

FIBREGLASS —	
4" x 3" S.S.	.75
6" x 4" S S.	1 20
8" x 3" S.S.	1 20
6" x 6" S.S.	1.60
8" x 6" S.S.	2.20
12" x 4" D.S.	2 90
12" x 12" D S.	6.00
6M CONVERT	2.50
2M CONVERT	2.50

DIP SOCKETS

8 PIN	.45
14 PIN	.48
16 PIN	.54
24 PIN	.95
40 PIN	1.50

TOROIDS, etc.

IRRESPECTIVE OF MIX

T-12	70
T-25	.75
T-37	.80
T-50	.85
T-68	.95
T-80	1.10
T-94	1.50

Free Data on request.

COIL FORMS

NEOSID772/1	.20
5027/6PLB	.20
7100CAN	.20
5200/8PLB	.25
7300CAN	25
F16 or F29	.12

MISCELLANEOUS

SO239	1.95
PL259	1 95
BNC Pug	2.30
BNC Sockets	1.60
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PLENTY OF PARKING AT REAR

STD 02

A 20 WATT LINEAR AMPLIFIER FOR THE IC202

Ian Berwick VK3ALZ.

The popular IC202 lacks one thing. Sufficient power to make very long haul contacts from the home location. Ian presents a circuit to give the 3 watt signal a real boost.

In June 1972 Hamish VK3ZMV published an article in the now defunct Victorian VHFer. The article described a 25W 2 metre class C amplifier. It used a 2N3866/2N4427 followed by a BLY87A and a BLY89/BLY89A. For an input of 70-100 mW an output of 25-35W was obtained. The circuit presented here is based on the above design.

The IC202 provides more than a 2N3866 is capable of so the amplifier was reduced to two stages. The 2N5590 transistors and 2N5991 transistors were more readily available to the author than the original types and so were pressed into service. The same board layout was retained. In the original VK3ZMV article construction featured a double-sided PCB with one side as a ground plane, through connections being made with eyelets. In the amplifier described here the earth pads are connected by small bolts to the lid of the enclosing diecast box. A single-sided board is used.

The circuit is shown in Fig. 1. Minor changes were made to the matching networks. A stiff bias supply is provided for Q1 and Q2. The bias is removed to disable the amplifier during reception although the collector supply remains connected as can be seen in Fig. 2.

To provide a means of controlling the two relays used in the amplifier a wire is run from the 9V transmit rail in the IC202. If you do not wish to add an extra wire then the centre conductor of the aerial coax may be used.

The general layout may be seen from the photograph. The bias network is on the separate board.

No difficulties have been encountered with the amplifier in service and signal reports have been excellent. ■

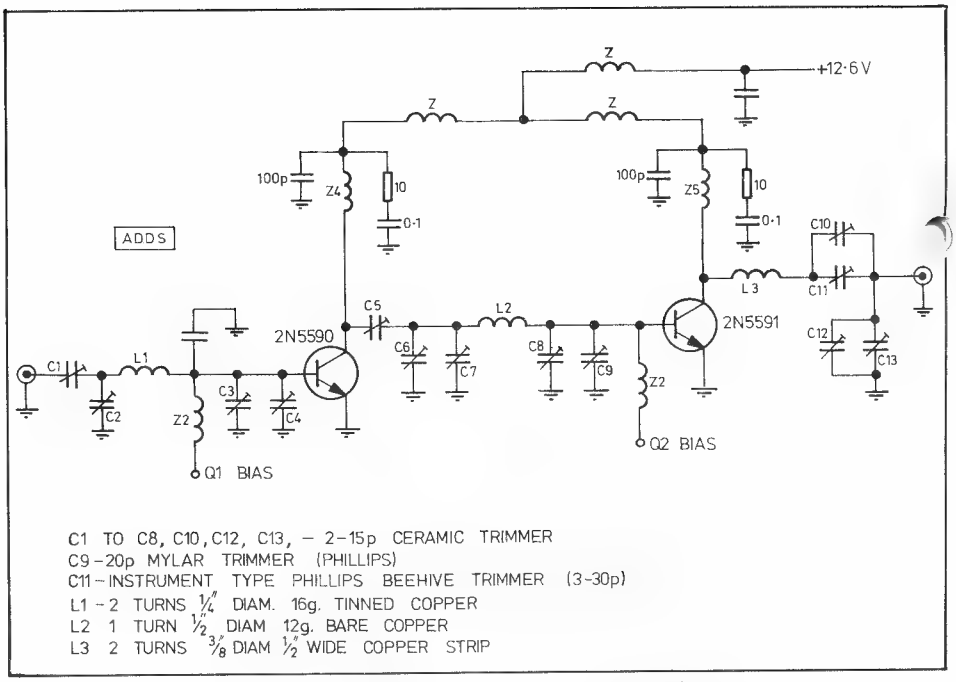


FIG. 1. Schematic of 20 watt linear amplifier.

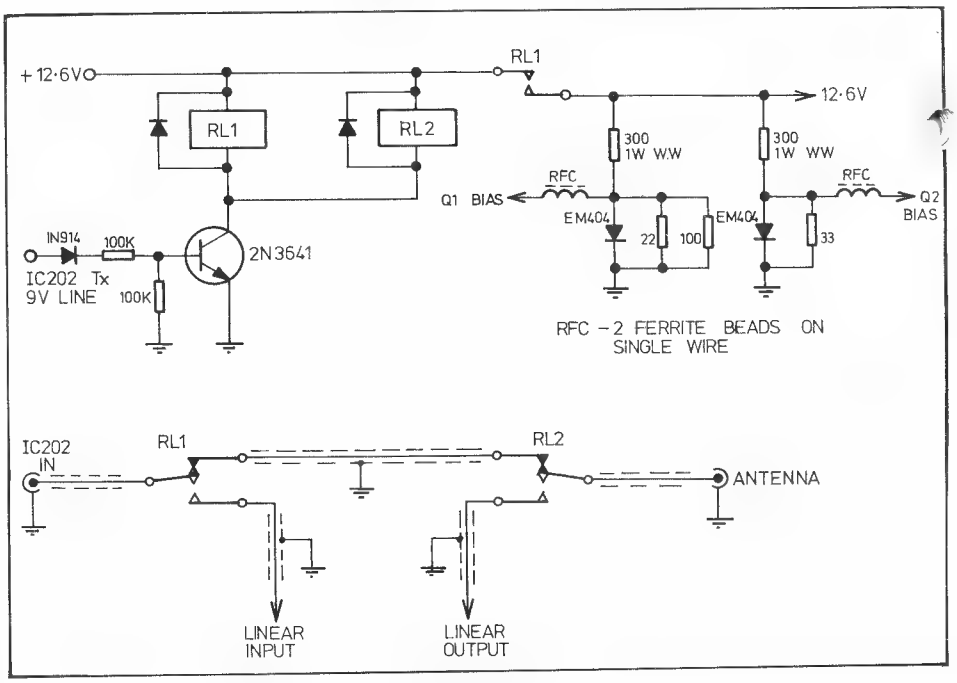


FIG. 2. Antenna changeover relay for IC202.

SUMMERLAND RADIO CLUB AIDS HANDICAPPED CHILDREN

Fred Herron VK2BHE,
President and WICEN Co-ordinator,
Summerland Radio Club

Summerland Radio Club, VK2AGH, Lismore, achieved a major breakthrough in operating approval when, on 19 June, 1977, it was given permission to transmit, during the course of a WICEN exercise for Club members, information relating to a Telethon Appeal conducted for the benefit of a very worthy charity, the Sub-normal Children's Welfare Association.

The initial approach to the Club was made by State Emergency Services Headquarters at Lismore in the manner of a request that the Club provide an emergency radio link between Bonalbo and Lismore for the purpose of transmitting pledges to the Telethon Appeal. Club Secretary, Harold Wright VK2AWH, discussed the problem with Club WICEN Co-ordinator and President, Fred Herron VK2BHE, and it was decided to inform SES that we would willingly conduct the operation, provided official approval could be obtained.

Harold, noted for his expertise in getting his way with Authorities of all kinds, prepared a very persuasive submission seeking approval of the operation, although he was not very hopeful of success, particularly having in mind the responses received to similar requests made in other areas on prior occasions. Little did he realise the impact his efforts would have on the future of WICEN exercises of this type.

Perhaps it was the very strong support given by SES which brought about the change in the Official attitude to this type of operation! Or perhaps it was the very charitable nature of the appeal involved! We like to think it was "our man Harold" who did the trick.

Whatever the reason, about seven days after the date we had fixed as the deadline to enable us to organize the operation, which time we had given up hope, Harold received notification that official approval of the operation had been granted. The grant of approval was made subject to certain conditions, namely:

1. The exercise must be an official WICEN exercise.
2. The exercise must be conducted under the conditions of a controlled net.
3. The exercise must be logged throughout.
4. The District Radio Inspector must be given prior notice of the exercise.
5. The information transmitted must be non-commercial in nature.

Furthermore, we have been informed that this approval granted to the Summerland Radio Club is to form the basis of a general approval for this type of operation in the future.

After the initial flush of success had subsided, we had the rude awakening of having to organize and carry out the task ahead of us. Club WICEN activities were well organized, so there was no lack of volunteers. As to the operation itself, VHF seemed the desirable medium. However, Lismore and Bonalbo are separated by about 120 km geographically, and in between we have the Mallanganee Ranges rising to about 450 metres AMSL. The obvious solution was a link on the top of the ranges, so a preliminary task force of amateurs was sent out for preliminary tests.

It would take far too long to give a fully detailed account of the testing and organisational procedures leading up to the day of the operation. It is sufficient to say that when the day dawned on 19 June, 1977, Summerland Radio Club was ready.

Net Control was established at the highest crest of the Mallanganee Ranges on a windswept hill. We were fortunate in having access to a small building, otherwise we would never have held the equipment down in the gale force wind conditions which prevailed on that day. The erection of antennae was a major task in itself, and it was necessary to pay constant attention to beams which suffered from heavy wind blasts. Whenever it was necessary to swing a beam back on to a correct heading, straws were drawn, and as the luckless loser, heavily rugged against the wind and cold, exited from the building, those remaining said a short prayer for his safe return.

Portable 1 was established at Bonalbo in the school building run by the Sub-Normal Children's Welfare Association, and Portable 2 was established in the SES Headquarters at Lismore.

Two VHF channels and one HF channel were operated throughout the period of the Telethon Appeal. VHF channel 1 was used to transmit specified information one way only from Bonalbo to Lismore — this was by way of 144.250 MHz from Bonalbo up to Mallanganee, where the signal was switched electronically from one rig to another, and re-radiated from Mallanganee to Lismore on 147.750 MHz. Channel 2 was operated simplex, both ways, on 146.150 MHz, with a stand-by frequency for this channel on 146.500 MHz. For the HF link we used 28.010 MHz. On VHF we used a number of KYOKUTO rigs, as well as a MULTI 7, an FT221R, and a TS700A. On HF we used FT101B's. We had an adequate number of back-up rigs for all channels. The antennae were mainly horizontally polarised beams, with 5/8 verticals also at each site.

Apart from some minor teething problems when establishing the net at the commencement of the operation, the only difficulty we encountered was that of gradual power loss in the busy KYOKUTOs due to overheating over long periods of operation. We overcame this by running on low power which, in the end result, did not degrade the net in any way.

The Club members really came through with flying colours. Space does not permit mentioning them all by name, but they really deserved the accolade they received in the local press, and in the press and TV and radio media throughout the whole of the north-eastern area of N.S.W. We had a very full PR coverage, including large press photographs and TV coverage, and quite apart from the advancement of the local image of the Summerland Radio Club, Amateur Radio generally, benefited tremendously.

Last, but by no means least, the operation was especially beneficial as a WICEN exercise, by giving our members invaluable experience in the field of a type which, in this area in which civil emergencies are by no means uncommon, will certainly be of great benefit in the future.

As a postscript: This Summerland Radio Club WICEN exercise transmitted donations to the Sub-Normal Children's Welfare Association totalling $1,755.35. ■

TRY THIS

WITH THE TECHNICAL EDITORS

SOME PCB ETCHING TIPS

Solvent for "DALO" pen.
Ordinary Mineral Turpentine will remove Dalo ink much better than the resist remover supplied by DSE.

Using the "DALO" pen.
When drawing a board with this pen small bubbles can appear, also sometimes during etching the ink will part company with the copper it is supposed to be protecting.

Both these problems can be largely obviated by thoroughly cleaning the copper and then lightly etching the entire surface of the board before drawing the tracks. This slightly etched surface will hold the ink much better than the shiny copper.

Preparing pads for IC's.
Where integrated circuits are to be mounted on a PCB it is difficult to draw individual pads. Use as a template a piece of commercially made IC mounting, carefully prick through the holes with a sharp scriber then apply a solid bar of resist ink along the marks. When the ink is dry carefully scratch it away from between the pads, leaving them nicely square.

Uses for small scraps and laminate.
When making PC boards we often finish up with small offcuts of no use for the original purpose. These can be used to make nameplates. Just carefully letter them as required, etch in the usual way and attach to the equipment. With care, these etched nameplates can be made to look quite professional.

Bruce L. McCubbin VK3SO. ■

VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
	VK2RHR, Mittagong	144.120
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTT, Mt. Mowbullan	144 400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Lonah	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Manawatu	52 500
	ZL2VHF, Wellington	145.200
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

The beacon list has been shortened somewhat this month with the removal of the New Zealand 432 MHz beacons. These will be included from time to time as a reminder they are there, but I cannot help forming the opinion that their listing serves little purpose for VK operations because I have never yet received any reports from anyone to the effect that they have heard a 145 MHz beacon from across the Tasman, let alone one on 432 MHz! This is not to say someone has not heard a 2 metre New Zealand beacon, but generally such news filters to me eventually, and I cannot recall ever being told. The New Zealand beacons being about 1 MHz higher in frequency than most Australian beacons tends to preclude VK operators thinking about them, let alone listening for them. Additionally, some beacons in New Zealand operate with directional antennae, etc., which probably does not favour VK. Anyway, those are just a few reasons why they will not be included each month as in the past.

The overseas six metre beacons I believe are in a different situation. Six metres is capable of opening with good signals at ANY time; it is the unpredictability of the band which makes it interesting and when conditions are right many thousands of kilometres between stations is not a real problem. Now the gradual rise in the sunspot cycle may well see more contacts with distant stations on six metres across the equator. News of any other similar beacons in the Pacific area which are definitely operating would be appreciated.

A letter has arrived from Tony VK2BAM ex VK2ZCT in the Newcastle area which says he has been active on 2 metres since 1952 and 6 metres since 1964 when he worked me for the first time on 26/12/64! Being self employed, Tony mentions he has opportunities to be at home more than some people, consequently monitors the bands quite a bit. This paid off on 17/4 when he heard weak CW on 52.050, which ended in making contacts with JA1TTS, JE1BQT and heard JH1ECU, thus giving him his first JA contacts. Further monitoring of six metres has resulted in hearing several stations for short periods as the band either opens or operators at the other end come on! John VK4ZJP in Townsville and John VK5ZBU in Adelaide, during July and August respectively, indicate the considerable distances over which stations were worked. Tony uses an FT620B on six. Other stations in the Newcastle area currently on six metres include Bill VK2BMX, Barry VK2AHE, Gus VK2ZGJ, Ray VK2AVR, Bob VK2ZJP. In Raymond Terrace, Mac VK2ZMO is off the air temporarily due to antenna damage; also there is Glen VK2YAU, in Kurri Kurri, Des VK2ZDN, with an IC502, and south of Newcastle Jack VK2AJY.

Tony mentions also some strange conditions existing on 29/5 when a large pool of very cold air was located over N.S.W. brought in the Channel 2 repeater at Orange. The extent of the coverage from there is interesting and I include details. Tony worked Robert VK2ZRJ in Orange, Kerry VK2BXD Moree, Ted VK3TG and Noel VK3ANW in Kyabram, Dave VK2SB Sydney, Bob VK3AJN Wangaratta, John VK1FT Canberra, Nev VK2DR Bathurst and Norman VK2BNC in Young. At 2117Z he worked Warrane VK2ASM in Sydney and Bill VK1BH/M in Canberra through Channel 7 repeater near Canberra. Neither repeater had been audible before or since!

Thanks for writing, Tony, at least some news trickles through from VK2 at times.

A letter, which was obviously mislaid somewhere as it is dated 3/6/77, comes from Col VK7LZ, but the information it contains is still relatively current. Sorry for the lateness, Col.

"KC4AAA has been on Oscar 6 and 7 mode A since the beginning of March this year. Whilst having a yarn to Jerry and Lloyd at the South Pole station yesterday, they complained to me about the lack of activity by VK stations, and seeing that their aerial rotators won't work at minus 80 to 100 degrees C (they have their cross yagis beaming on VK, and locked with ice!), they have asked me to appeal for help. They also said they would get on Mode B if they thought it worthwhile.

"I don't know what activity is like these days, as I haven't been on Oscar or VHF for several weeks due to a spell in hospital. If anyone does work KC4AAA they will be sure of a QSL. Send your card to W6MAB, 2305 Panorama Drive, La Crescenta, California, 91214, U.S.A. No I.R.C.s are required but you must send an addressed envelope for the card."

So there is a plaintive cry from the cold wastes of the Antarctic. Can any of you respond by keeping an ear open for these lonely operators?

I have also received a letter from the Secretary of the Hong Kong Amateur Radio Transmitting Society, John Sweeney VS6GG, advising in writing what I had already received previously, that the Hong Kong TV operates in the UHF band, so was not providing TV audio on 51.750 MHz. He affirms that a request has been made to the Licensing Authority for a "window" centred on 52.1 MHz for TEP experiments; so far no reply. The principal activist on 6 metres in Hong Kong is still Lyell VS6BE, who is ideally located on top of Victoria Peak, and keeps a lookout for VK six metre operators. Anyone who would like to attempt a QSO should transmit on 52.1 MHz and listen on 50.1 MHz. Thanks for writing, John.

That last paragraph once again outlines the unfortunate position we are in in VK with our 2 MHz offset from the main centres of the world's 6 metre activity. Apart from all other factors efficient six metre beams rarely work well over a 2 MHz band-width, so one end of the QSO must suffer some degradation of signals.

Of course you all know what this is leading up to — especially as I hope you will have read closely my comments on six metres and band allocations in the last issue of Amateur Radio. I doubt very much if anyone could possibly disagree with the general basis of the words so written, so have you done anything about writing to me setting out your views and support, I hope, for an attempt to get something done to overcome the obstacle of the 2 MHz separation? If you intend writing why put it off any longer? If I am to do anything worthwhile, let me get started now. I need your support, and plenty of it, so get cracking. And what about some comments on a proposed HF net once a week to discuss VHF and UHF matters? So far, a few operators have indicated they are in favour, but surely more of you could indicate some interest! Go to it, get those letters rolling, it would give me great pleasure to be able to write next month and say I had already received 200 letters! My mail box will hold in excess of 1000 letters at one depositing—anything over could be put in my neighbour's!

I notice a little tit-bit in "Q.R.M." inserted by Col VK7LZ re Sunspots and the Amateur. He reports: "In an informative article in the May 1977 issue of QST, possibly America's foremost authority on VHF and the Sun, Ed Tilton W1HDQ reports that in retrospect mid-year 1976 saw the end of the sunspot cycle 20.

"Late in June last year a cycle 21 group of sunspots lasted an entire orbit of the solar disc, the first new cycle activity that has been seen to do this, and as Ed goes on to say, and I quote, 'If you sort out the sources of what little July activity there was and draw curves of both cycles, the old cycle curve drops to almost zero while cycle 21 curves cross it on the way up. Though activity has been mostly low the rise since has been all new cycle orientated.' "

What all this means is that sunspot numbers will gradually increase until they reach another peak of the 11 year cycle around 1979 to 1980, which in turn generally indicates increased activity from distant areas, including overseas countries, on the six metre band, with probably a decrease in the total coverage of 144 MHz. This latter point probably has not been sufficiently investigated, but there seems to be some indication that 144 MHz improves during the low parts of the cycle. This may be due to decreased interest in 52 MHz with a possible increase in interest in 144 MHz! Now if you have sorted that out, let's all see what happens during the next few years. Prior indications have pointed to a faster rise in 52 MHz activity from the low part of the cycle, compared to a relatively long drop off after the peak of the cycle.

Probably the most interesting points to observe will be that the next peak of the 11 year cycle will occur when almost every station of any note will be operating with at least SSB or CW capability, of good quality, and with a reasonable antenna system. Such a situation has not existed before. During the last peak around 1968/69 there were still many stations still on AM. Since then the total state of the art has shown considerable improvement. Hence, even if the peak is not as great as that of 1957/58, which was the highest since records have been kept, and indications are that it will not be anywhere near as high, the better overall equipment could conceivably assist in making up the leeway.

Personally, I look forward with immense interest to the next peak, and particularly from next year onwards, just to see what our present good equipment can turn up. If we can only get something done to overcome our 2 MHz disability on six metres so much more could be done in the manner of very long distance experiments. If we are not able to get down on 50 MHz we are going to be at a greater disability this time than we have ever been before, and the missed opportunities will be great. So it's up to you, the readers, who operate VHF to get on the band wagon and try and get something done. I am prepared to lead you!

REPEATER USAGE

I am sure this Editorial from the Gold Coast Radio Club Newsletter of July 1977 bears reprinting as it highlights a very common problem which exists everywhere. I quote:

"During the past several months it has been noticed; and people have been told repeatedly . . . to allow the repeater to drop out in between overs.

"This was brought to a head on Saturday, 16th July, by TWO emergencies where it took up to FIVE MINUTES to get an urgent request for help acknowledged and acted upon.

"The extremely prevalent practice of coming straight back when the other operator signs over, WITHOUT A PAUSE, is not only Selfish, Rude, but downright Self-centred and Inconsiderate, and could mean the difference between Life and Death!!!!

"In such a case, due to the 'capture effect', a weak or more distant signal from the repeater — needing it for an emergency — CANNOT override a stronger or more local signal with CATASTROPHIC and possibly LETHAL results!!!!

"Further to this, it was also noticed repeatedly that when the emergency traffic was passed to an operator within reach of a phone, other operators will persist in throwing in their 2c worth, with the end result being CHAOS, BEDLAM and CONFUSION!

"Let us set an example in repeater etiquette. If there is a Mayday, Pan or even Emergency call,

the only person to answer should be someone within reach of a phone . . . mobiles stay out of it! Once an operator is in contact with the person on the scene, everyone else should B———— well shut up!! At least until the operator has finished with contacting the authorities.

"REPEATER USAGE: 1. No overs longer than two minutes. 2. ALWAYS leave a pause between overs. 3. When repeater is on emergency power, signified by short, regular tone pips, remember tnat every single word said on the repeater consumes precious power, which could be needed to save YOUR life. 4. Shift off repeater for local QSOs. 5. Shift off repeater for QSOs between base stations with rotatable aerial farms capable of simplex working. 6. Remember, repeaters are primarily intended for mobile usage. FINAL: Pertinent, Poignant Point: ALWAYS leave a PREGNANT PAUSE."

O.K. Let all repeater users study what has been written in very strong terms, and act upon all the good points so stated. However, it would be a fair bet to say that those who could be classed as some of the worst offenders, and they are here in VK5 too, are probably not WIA members and therefore do not have an opportunity to read these notes. Perhaps they should be told politely by someone else who does care. Think about it!

MOONBOUNCE REPORT

The VK2AMW EME tests or July were made on 28/7 with WA2VWL, YV5ZZ, W5FF and XE1RY. We were hearing our echoes at 6 to 7 dB over noise, but none of the scheduled stations appeared to be on.

K3NSS was heard on 432.015 MHz and later on 432.010 with signal strength up to 15 dB over noise. This big signal comes from a 94 foot dish at the U.S. Naval Communications Station in Washington, D.C., according to their QSL card which was received recently for our contact with them on 28/5/77.

The hardware has now been made up for the new feed system for the dish. It is being initially set up at the QTH of VK2ALU to determine its effect on the resonant frequency of a 432 MHz dipole and reflector, as a guide to the modifications needed to the crossed dipoles at present used as the dish feed.

Repair work is continuing on the dish surface and the high tensile bolts will be installed in place of bolts which have failed as main shaft bearing holding down bolts. All this work should be completed soon if the recent strong winds abate for a few days. The new feed system will then be installed.

The next scheduled monthly tests are to be put back one week according to K2UYH. This will give VK2AMW a more favourable window with the European station . . . from the "Propagator".

THE LOCAL SCENE

1296 MHz has shown an upsurge in interest in VK5 with Keith VK5SV and David VK5KK both with foot dishes and suitable equipment to drive them, and have been getting quite spectacular results into Adelaide with a few milliwatts output. Peter VK5ZPW has a 5 foot dish and has been running tests using the third harmonic from 432 MHz.

Still in the limelight, Keith and David have completed the erection of a new 144 MHz antenna system consisting of a pair of vertically stacked home built 16 element yagis, which look very nice and perform extremely well. They have increased their signal strength here quite dramatically. I hope to have my own two similar antennae up in the air by the time you read this, with some signal improvements for me also.

Recently David VK5KK and I conducted some tests on 432 MHz following the erection by David of a new home brew 16 element yagi for that band. In an effort to see how good the antenna was I suggested coupling my transistorised marker generator on 432 MHz to the 13 element yagi I use. The path distance is 35 miles over hills but the signal was just audible. Power output of the order of no more than 1 milliwatt! The path between us is rather unique as it is quite easy to conduct two way SSB contacts with about 20 milliwatts of power on 432, 144 and 52 MHz. Our standard signals used for crossband contacts are rarely more than 3 watts at either end irrespective of what band is in use. This is the intriguing thing with VHF/UHF, the unknown which pops up.

Ed VK8NER/6 received a pleasant surprise on 20/8 when he heard the VK5VF 144 MHz beacon at Giles weather station in W.A. just over the Northern Territory border. Eddie VK5NXP was in contact with VK8NER/6 on 10 metres, and heard the 2 metre signals being relayed on 10 metres by Ed, who was furiously calling on 144 and 432 MHz. This was on the Saturday afternoon local time. The next day, 21/8, the signals were still there. Ron VK5ZJG heard the signals too whilst in VK5NXP's car, and the news was sent via John VK5NJP on 80 metres. Unfortunately, none of the gentlemen concerned thought to contact anyone well set up for 2 metre and 432 contacts, which meant a lost opportunity and disappointment for VK8NER/6. The best suggestion I can make no matter where this sort of thing is happening, if you haven't the equipment capability to respond to the VHF signals of the other operator, please immediately pass the news on to someone who has, either by telephone, repeater or some other means. Lost opportunities sometimes mean operators of the more distant stations can become disenchanted and give away their whole interest in VHF and will turn to the ease of HF operating.

There seems nothing else at this stage to acquaint you with — apparently no one has been doing anything very spectacular. There have been a number of 144 MHz openings across the southern States during the month, which is normal for the time of year. Before I go I must remind you to watch 6 metres during the early part of October for TEP and other across the equator openings, which ultimately then leads you into an increasing number of better openings to other VK areas. If you can monitor 49.750 MHz for TV audio from the north you could be rewarded with contacts to Japan and elsewhere. Above all however, whenever you are in the shack and not actually operating, do monitor some frequency, whether it be 49.750 or 51.750 for Channel 0, 52.050 for calls from anywhere, and/or 144.100, particularly at night and early morning. If someone should be heard you are then in a position to give a call back, and with the now rising sunspot numbers you could well be surprised what might be heard, so I repeat, monitor a frequency when in or near the shack.

Closing with the thought for the month: "You can discover more about a person in an hour of play than in a year of conversation."

73. The Voice in the Hills. ■

IARU NEWS

VISITORS TO AUSTRALIA

Once again Australia is receiving blame for allegedly refusing to recognise valid overseas licences. The examples now quoted are Fi,i and West Germany. In respect of Fiji a correspondent goes so far as to say he has been given to understand no Fijian licence will be issued to any Australian.

The reciprocal licensing conditions were published in AR for August 1972, page 17. From these it will be observed that two different situations are catered for, namely, (a) the visitor to Australia (up to 12 months) and (b) the intending resident.

Any amateur visiting Australia for a short period (up to 12 months) can obtain a VK licence by asking for it and producing proof of his overseas licence. The Department confirmed this quite recently, especially in relation to Fi,i.

All the visitor has to do is to prove he is in Australia on a temporary visit. The situation for intending residents is different. Here the rules of reciprocal licensing apply only with administrations recognised by the Australian administration — as set out in AR quoted above. Anyone from any other country must pass the requisite Australian amateur examinations if he intends to settle in Australia.

These arrangements for visitors were negotiated by the WIA and are in fact well in advance of almost every other country in the world. ■

CORRECTION TO SEPTEMBER AR

Please alter 8th para. in the centre column P.22, September '77 AR — Replace "plenipotentiary" by "administrative". ■

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

October		
	1/2	VK/ZL/OCEANIA PHONE CONTEST
	8/9	VK/ZL/OCEANIA CW CONTEST
	8/10	ARCI QRP Contest
	12/13	YLRL Anniversary CW Party
	14/16	Scouts' Jamboree of the Air
	15/16	Manitoba QSO Party
	15/16	RSGB 7 MHz Phone
	29/30	CQ WW DX Phone Contest
November		
	3/4	YLRL Anniversary Phone Party
	5/6	RSGB 7 MHz CW
	12/13	European RTTY Contest
	19/20	WWDXA CW Contest
	26/27	CQ WW DX CW Contest
December		
	3/4	Spanish Phone Contest
	10/11	Spanish CW Contest

CQ WW DX CONTEST

Phone October 29-30, CW November 26-27. Starts 0000 GMT Saturday; ends 2400 GMT Sunday.

Objective is for amateurs to contact other amateurs in as many zones and countries as possible. All bands 1.8 to 28 MHz may be used.

There are three categories.

1. Single operator (single and all band). Single operators must have no assistance in operating, logging or spotting. Any assistance places the station in the multi-op. category.

2. Multi-operator (all band only): (a) Single transmitter only, one transmitter and one band permitted during the same time period (defined as 10 minutes). Exception: One, and only one, other band may be used during the same time period if the station worked is a new multiplier.

2. (b) Multi-transmitter (no limit to transmitters but only one signal per band permitted at a time).

Exchange RS(T) and zone (i.e. 5705, 57905).

Multipliers: There are two types of multipliers. Each different zone contacted on each band, and each different country contacted on each band count as a multiplier of 1. Stations are permitted to contact their own country and zone for multiplier credit.

Points: 1. Contact between stations on different continents are worth 3 points.

2. Contacts between stations on the same continent but different countries 1 point.

3. Contacts between stations in the same country are permitted for zone and country multiplier but have no QSO point value.

Score: The final score is the result of the total QSO points multiplied by the sum of multipliers. (i.e. 1000 QSO points x 100 multipliers (30 zones and 70 countries) = 1000,000 final score).

Awards: First place certificates will be awarded in each category, in each participating country and in each call area of the US, Canada, Australia and Asiatic USSR. To be eligible for an award, single operators must show at least 12 hours operation, and multi-operators at least 24. A single band log is eligible for single band awards only.

Log instructions: All times in GMT. Indicate zone and country multiplier only the first time it is worked on each band. Logs must be checked for duplicate contacts, correct QSO points and multipliers. Use a separate sheet for each band. Each entry must be accompanied by a summary sheet showing scoring information, category, name and address in block letters, and a signed declaration. All entrants are required to submit cross check sheets for each band on which 200 or more QSOs were made.

Deadline: All entries must be post marked no later than December 1, 1977, for the phone section, and January 15, 1978, for the CW section. Indicate phone or CW on envelope.

Logs go to —

CQ WW Contest Committee,
14 Vanderventer Avenue,
Port Washington, LI, NY, USA 11050. ■

EMONA electronics

CBC BANK BUILDING, HAYMARKET
Room 208/661 GEORGE STREET,
SYDNEY, NSW

PHONE: 212 4815
A.H.: 399 9061
398 6378

MAIL ORDERS: **Box K21, Haymarket NSW, 2000, Australia**

WRITE, PHONE OR CALL IN!

INTRODUCING NEW LINEAR AMPLIFIERS

DENTRON RADIO Co.: MLA-2500, 160-10m. linear amplifier.
DENTRON RADIO Co.: MLA-1200 — 80-10m linear amplifier.
DENTRON RADIO: 160-10L Superamp, 160-10m linear amplifier.
SCS: HF3-100L2, 3-30 MHz bi-linear amplifier.
SCS: 2M10-80L, 144-148 MHz, FM/SSB linear ampl.
METRON: MA1000, all solid state, 1 kW amateur band linear amplifier — lightweight, compact and rugged.
YAESU MUSEN: FL-2100B, 80-10m linear amplifier.

ANTENNAS:

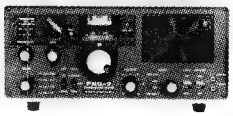
HUSTLER: 4-BTV — vertical trap antenna.
HUSTLER: Mobile vertical trap antenna (80-10m).

Announcing:
NEW FU400 ANTENNA ROTATOR for all medium-sized HF beams.

AMATEUR BAND TRANSCEIVERS:

NEW — NATIONAL: RJX1011 — Unique SSB/CW 160-10m transceiver with digital readout and matching speaker and external VFO.
TRIO KENWOOD: TS520S — SSB/CW, 160-10 metres, with optional digital readout.
TRIO KENWOOD: TS820S, 160-10 metres digital readout.
TRIO KENWOOD: TS820, 160-10 metres.
TRIO KENWOOD: TS700A — 144-148 MHz all mode transceiver.
TRIO KENWOOD: TS600A — 50-54 MHz all mode transceiver.
TRIO KENWOOD: TR-7400A — 144-148 MHz FM transceiver.
YAESU MUSEN: FT101E — 160-10 metres, AM, SSB, CW transceiver.
YAESU MUSEN: FT301 series, 160-10m AM, SSB, CW transceiver.

RECEIVERS:



TRIO KENWOOD: R300 general coverage BCL receiver.
YAESU MUSEN: FRG-7 general coverage Rx, Wadley Loop System.

ALL AMATEUR RADIO EQUIPMENT IS AVAILABLE ON 10% DEPOSIT TO APPROVED BUYERS!

Check EMONA'S most COMPETITIVE Prices!

QUALITY Q.S.L.'s are HERE!

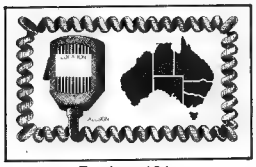
A fine range of quality QSL cards are available at selected retailers now!
A multitude of designs are available all over printed with your call sign and address in your choice of glowing metallic foil.
These cards are not meant to replace your bulk QSL's, but as well as, for your special contacts.
Agent or retailer enquiries invited throughout Australia.

AVAILABLE AT
VIC.: Audio Shack, Bail Electronics, Delta Base, Eastern Communications Centre, Graham Electronics (Mitcham), E.B. Service Centre (Burwood), Radio Parts, Vicom.
N.S.W.: Audio Shack, Emona Electronics, Tweed Heads 2-way Radio.
S.A.: Watsons, World Imports, Xenon World Imports.
A.C.T.: Diacom Electronics.
W.A.: Abel Music Co., WACB Radio Centre.
N.T.: The Communications Centre, Alice Springs.
TAS.: CB Emporium.
and many more retailers throughout Australia

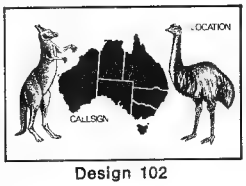
****

TEMPORARY QSL CARDS!

All printed in two colours on front with your State in second colour, details on back in second colour, on quality QSL cards.



Design 101



Design 102

To Quality QSL
34 Devonshire Drive,
Noble Park, Vic. 3174

☐ Please rush me . . . hundred preprinted QSL Cards
Cat No. . . . . @ $4.95 per 100. Plus 45c p&p.

Specify State . . . . . .

NAME . . . . . .
ADDRESS . . . . . .
. . . . . .
. . . . . Postcode . . . . . .

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Crafers SA, 5152

AUSTRALIAN DXCC TOP LISTINGS AS AT 24/8/77

PHONE		CW	
VK6RU	322/354	VK3XB	280/300
VK4KS	320/339	VK3NC	268/297
VK5MS	313/343	VK6RU	267/296
VK6MK	311/338	VK4KX	261/266
VK3AHO	304/326	VK3YD	258/281
VK4UC	301/306	VK4RF	254/271
VK2APK	300/313		
VK4FJ	297/324	OPEN	
VK4PX	297/304	VK6RU	322/354
VK3JW	294/301	VK4KS	321/345
VK5AB	291/314	VK4SD	318/339
VK6LK	290/295	VK2APK	311/329
		VK6MK	310/337
CW		VK4FJ	309/341
VK2EO	317/346	VK4PX	304/315
VK2QL	308/337	VK4UC	304/310
VK3AHQ	308/331	VK2SG	301/311
VK3YL	298/321	VK3JW	295/302
VK4FJ	297/329	VK4RF	289/306
VK2APK	291/304	VK3XB	286/306

DXCC NEW MEMBERS SINCE 23/11/76
VK2AML Tally 179 Phone
VK3GI Tally 103 Phone.

WAB BRITISH COUNTIES AWARD
In this Silver Jubilee Year of H.M. Queen Elizabeth II the WORKED ALL BRITAIN (WAB) Organisation has introduced the "WAB BRITISH COUNTIES AWARD".

Contacts with UK amateurs since 1/5/1974 count for the award. No QSLs required, only a certified list showing date, time (GMT), C/S of UK Stn. Wkd., His RS(T), my RS(T), county.

Class 2 is for any 55 UK counties, Class 1 is for all the UK counties and Scottish Regions, plus one GC/GJ (Jersey) and one GC/GU (one from Guernesy, Alderney or Sark, and one GD).

Cost of award and postage world-wide, £1 or USA$2 or 20 IRCs. Cost of further claim to upgrade Class 2 to Class 1 is £0.50 or USA$1.00 or 10 IRCs. Claims to

G4AVA, Alec Brennend,
76 Deneley Ave.,
Todmorden via Lancs,
England.

The WAB/HAB record book costs £2.60 (USA$5.00) from G4CON (QTHR), nearly 200 pages of information on WAB/HAB and awards WAB/HAB, DCC, WABBA, WABLS, WABDA, WABEMA.

WAB is all-band, all-mode, world-wide. Every UK QSO will count.

Profits from WAB go to RAIBC (Radio Amateur Invalid and Bedfast Club). ■

BOOK REVIEW

RADIO SERVICING POCKET BOOK
by Vivian Capel

Published by Newnes-Butterworths.
Review copy from Butterworths, Chatswood, NSW.
This book of 230 pages endeavours to cover the very wide field of electronic servicing applied to domestic run-of-the-mill AM and FM radios. Having been in servicing on and off for many years I found the book most interesting. A number of simple descriptions were given to describe complex receiver functions and I must admit Vivian Capel succeeded in this difficult feat, where many others have failed.

Keeping in mind that this is a British book, and making appropriate allowances for the differences between the style of radio equipment used and broadcasting system used, the book should prove useful for anyone contemplating servicing domestic radio receivers. It would also be useful for amateur operators to read as the general service procedures outlined can be followed when servicing amateur receivers.

The chapter covers AM/FM, stereo, car radios, portables, aerials, radio interference, components, and includes a small chapter on valved receivers which are still about, although in diminishing numbers. Several chapters are devoted to setting up the workshop, the equipment needed to do the work, and the general running of a workshop.

Fault diagnosis and receiver alignment occupy two chapters. I can only query the diagnostic method of fault finding when using a signal tracer. The method would not get a servicemen into trouble but is considered to be time wasting. With signal tracing the tracing is commenced at the aerial terminal and then worked through the receiver, not vice versa. In Figure 12.1 I believe the base voltage on the first transistor is incorrect. These problems all appear on page 175.

Other than these two minor problems I consider this book well worth the asking price of around $6, and I believe that any amateur who likes to fault-find his equipment will find this book most useful.

VK3UG.

RADIO COMMUNICATION HANDBOOK — FIFTH EDITION

This edition of the Radio Communication Handbook sees an interesting break with convention. The Handbook has been a standard textbook on amateur radio, with its almost encyclopaedic coverage of theory and practice, since its first publication in 1938. However, the completely revised text for the fifth edition was too big for one book. Hence, publication of this edition is in two separate volumes

Volume 1 includes chapters entitled (1) Principles, (2) Electronic tubes and valves, (3) Semi-conductors, (4) HF receivers, (5) VHF and UHF receivers, (6) HF transmitters, (7) VHF and UHF transmitters, (8) Keying and break-in, (9) Modulation systems, (10) RTTY.

Volume 2 not only includes a 98 page chapter on HF antennae, but also includes FM repeaters and slow scan television for the first time. Chapter titles are (11) Propagation, (12) HF aerials, (13) VHF and UHF aerials, (15) Mobile and portable equipment, (15) Noise, (16) Power supplies, (17) Interference, (18) Measurements, (19) Operating technique and station layout, (20) Amateur satellite communication, (21) Image communication, (22) The RSGB and the radio amateur, (23) General data.

The text of these excellent volumes is supplemented by hundreds of high quality line drawings, photographs, charts and tables: the paper and print is of a very good standard.

Altogether, the fifth edition of the Radio Communication Handbook is one of the best all-round reference books a radio amateur can possess. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,
In an endeavour to assist in raising funds for sponsoring an Australian Delegate to WARC 79, the Illawarra Amateur Radio Society is holding a guessing competition (rafle), the profits of which shall be donated to the fund.

Prizes are of a high standard, being: 1st, A Trio CO-1303D Oscilloscope DC-5MHz; 2nd, a Programmable Calculator SR-56 by Texas Instruments; 3rd, a Digital Watch.

Prizes total to a value of approximately $420, with 1000 tickets at $1 each being issued.

Tickets may be obtained from the Secretary, PO Box 1838, Wollongong 2500, by payment of $1 in advance.

Give your support.

Yours faithfully,
B. BOSELEY, Secretary IARS. ■

LARA

Ladies Amateur Radio Association

Spring has come, and with it the equally celebrated occasion of the change in LARA sked time. It will change from 8 p.m. EAST (10.00 Zulu) to 8.30 p.m. EA Summer Time (09.30 Zulu). To ensure that this momentous event receives the attention it deserves, daylight saving will begin the previous Sunday. The sked will remain on Monday nights on 3.650 MHz. New YLs are always welcome, after the first half hour OMs are usually tolerated.

The VK3 annual general meeting will be held next month. Afternoon tea will be served in order to attract enough members to fill the vacancies. All members should attend as we are not above voting members to office in their absence.

The date of the October meeting has not yet been fixed, if there is an October meeting. The publication schedule of AR is such the September meeting was not held before these notes were submitted.

Our membership is gradually creeping up to around the one hundred mark. This seems extremely small when compared to the total number of licensed amateurs in Australia, far less than 1 per cent. Surely there must be more women than this interested in amateur radio. If you are a woman who is even vaguely interested, don't hesitate to come to one of our meetings or write to us (c/o the Victorian Division of the WIA). There is no need to be daunted by the technical nature of amateur radio; many of our members have started with no technical background at all. With the amount of courses running at the moment it is relatively easy to find someone to teach you without the trauma that often accompanies being tutored by a member of the family or a close friend.

My thanks to Mavis 3KS for the information on sked times, which I had forgotten. However, Mavis takes no responsibility for their manner of presentation.

88s Heather Mtichell,
Temporary Publicity Officer. ■

PROJECT AUSTRALIS

Bob Arnold
VK3ZBB

If anyone had told you a few years ago that there would be seven or eight Amateur Satellites up at one time, what would you have said? Today, we can forecast this event with confidence — Oscar D should be launched in February, 1978, the Phase 3 satellite is scheduled for December, 1979, and now we have news from AMSAT of an exciting USSR programme in the very near future.

The USSR Administration has informed members of the International Telecommunications Union that the USSR will establish an amateur satellite service system which will be based on three or four satellites on a circular near-polar orbit.

The "RS Oscars" will probably be launched piggyback with the Meteor meteorological satellites from the Plesetsk launch site later this year and in 1978. The Oscars will have an inclination of 82°, an altitude of 950 km and an orbit period of 102 minutes.

The Uplink frequency will be 145.80-145.90 MHz with ¼ wave receiving antenna, circularly polarised. User uplink power 10-15W to 10-12 dB antenna, transponder receiver noise temperature 3000°K.

The Downlink frequency will be 29.30-29.40 MHz, transmitting antenna will be ½ wave circularly polarised and the transponder power 1.5W peak.

The maximum communications distance should be about 6000 km.

Amateurs world wide will welcome this new series of Soviet amateur radio satellites in the spirit of international friendship and co-operation.

I will provide more details of Oscar D next month, meanwhile, here is a summary to enable you to prepare your equipment.

1. Orbital Parameters:—
   Apogee — 929.178 km.
   Perigee — 882.967 km.
   Period — 103 minutes.
   Inclination — 99°.
   Time of descending node 0930 — + 30 min., — 0 min.
2. Transponder Mode J:
   Input — 145.90-146.00 MHz.
   Output — 435.10-435.20 MHz (inverted).
3. Transponder Mode A:
   Input — 145.85-145.95 MHz.
   Output — 29.40-29.50 MHz (NOT inverted).

Now for some local news:—

To give some indication of the activity on Mode B, I have recorded the stations worked in various call areas during the past two years. These are: VK1—3, VK2—9, VK3—12, VK4—9, VK5—14, VK6—10, VK7—4, ZL1—9, ZL2—9, ZL3—3, ZL4—3, VS6, KG6, JR6.

The most notable absentees are VK8 and VK9, particularly the Z calls who would be able to consistently work into other parts of VK without difficulty. The simple way to get on to Mode B is to acquire a Microwave Module transverter (advertised in AR) for the 432 uplink and a suitable SSB receiver for 145.95 and use ¼ wave groundplanes for the antennae. Hope we will hear you fellows in Darwin, Alice Springs, P.N.G. and the Pacific Islands.

Graham VK5EU has worked Oscar 7 on both modes A and B during his mobile expedition to VK2. On mode A he runs a home brew transmitter running 30W into dipole with a car radio antenna, suitably loaded on the 10m downlink. For Mode B he runs 15W PEP into a ¼ wave groundplane, and uses an IC202 for receiving.

Steve VK5ZIM has also been portable in the Adelaide Hills with fine signals on Mode B and has also used his equipment for demonstrations at VK5LZ, the station of the Elizabeth Radio Club.

Who's new on Oscar 7 in July/August?

VK1FT, VK2ZAZ, VK3ZCB, VK4ZBB, VK5LZ, VK7ZAK, ZL2WJ, ZL1FI, VS6BE.

Notable contact: VK6ZCC - VS6BE. ■

OCTOBER 1977 — ORBITAL DATA

OSCAR 6				OSCAR 7			
Orbit	**Date**	**Time**	**Lon. °**	**Orbit**	**Date**	**Time**	**Lon. °**
22682	1	00.14	67.40	13159	1	01.41	79.99
22695	2	01.09	81.15	13171	2	00.41	64.87
22707	3	00.09	66.15	13184	3	01.35	78.49
22720	4	01.04	79.90	13196	4	00.34	63.37
22732	5	00.04	64.90	13209	5	01.29	76.99
22745	6	00.59	78.65	13221	6	00.28	61.87
22758	7	01.54	92.40	13234	7	01.22	75.49
22770	8	00.54	77.40	13246	8	00.22	60.37
22783	9	01.49	91.15	13259	9	01.16	73.99
22795	10	00.49	76.15	13271	10	00.15	58.87
22808	11	01.44	89.90	13284	11	01.09	72.49
22820	12	00.44	74.90	13296	12	00.09	57.37
22833	13	01.39	88.65	13309	13	01.03	70.99
22845	14	00.38	73.65	13321	14	00.02	55.87
22858	15	01.33	87.40	13334	15	00.57	69.49
22870	16	00.33	72.40	13347	16	01.51	83.11
22883	17	01.28	86.15	13359	17	00.50	67.99
22895	18	00.28	71.15	13372	18	01.44	81.61
22908	19	01.23	84.90	13384	19	00.44	66.49
22920	20	00.23	69.90	13397	20	01.38	80.11
22933	21	01.18	83.65	13409	21	00.37	64.99
22945	22	00.18	68.65	13422	22	01.32	78.61
22958	23	01.13	82.40	13434	23	00.31	63.49
22970	24	00.13	67.40	13447	24	01.25	77.11
22983	25	01.08	81.15	13459	25	00.25	61.99
22995	26	00.08	66.15	13472	26	01.19	75.61
23008	27	01.02	79.90	13484	27	00.18	60.49
23020	28	00.02	64.90	13497	28	01.12	74.11
23033	29	00.57	78.65	13509	29	00.12	58.99
23046	30	01.52	92.40	13522	30	01.06	72.61
23058	31	00.52	77.40	13534	31	00.05	57.49
NOVEMBER 77							
23071	1	01.47	91.20	13547	1	01.00	69.99
23083	2	00.47	76.20	13559	2	01.54	83.61
23096	3	01.42	89.95	13572	3	00.54	68.49
23108	4	00.42	74.95	13585	4	01.48	82.11
23121	5	01.37	88.70	13597	5	00.47	66.99
23133	6	00.37	73.70	13610	6	01.42	80.61
23146	7	01.32	87.45	13622	7	00.41	65.49
23158	8	00.32	72.45	13635	8	01.35	79.11
23171	9	01.27	86.20	13647	9	00.35	63.99
23183	10	00.27	71.20	13660	10	01.29	77.61
23196	11	01.22	84.95	13672	11	00.28	62.49
23208	12	00.21	69.95	13685	12	01.22	76.11
23221	13	01.16	83.70	13697	13	00.22	60.99
23233	14	00.16	68.70	13710	14	01.16	74.61
23246	15	01.11	82.45	13722	15	00.15	59.49
23258	16	00.11	67.45	13735	16	01.10	73.11
23271	17	01.06	81.20	13747	17	00.09	57.99
23283	18	00.06	66.20	13760	18	01.03	71.61
23296	19	01.01	79.95	13772	19	00.03	56.49
23308	20	00.01	64.95	13785	20	00.57	70.11
23321	21	00.56	78.70	13798	21	01.51	83.73
23334	22	01.51	92.45	13810	22	00.50	68.61
23346	23	00.51	77.45	13823	23	01.45	82.23
23359	24	01.46	91.20	13835	24	00.44	67.11
23371	25	00.45	76.20	13848	25	01.38	80.73
23384	26	01.40	89.95	13860	26	00.38	65.61
23396	27	00.40	74.95	13873	27	01.32	79.23
23409	28	01.35	88.70	13885	28	00.31	64.11
23421	29	00.35	73.70	13898	29	01.26	77.73
23434	30	01.30	87.45	13910	30	00.25	62.61

IONOSPHERIC PREDICTIONS

Len Poynter VK3ZGP/NAC

Following a slight upsurge in activity in June, the months of July and August have been relatively quiet. In the background there has been some better than average breaks and a scan back through the daily indices indicate these improved conditions are occurring just prior to geomagnetic disturbances often associated with unusually "hot" spot groups.

The charts for October are based on relatively better activity than for the same period last year and there is promise if this activity meets the predicted levels.

One point is worth mentioning. Some of the paths are capable of opening either by the long route and short route, one preceding the other. With this type of chart presentation it is difficult to show both separately. One must use one's knowledge of what is happening with respect to the time of day. A noticeable one is the West African path. Long path.

It would appear around the time the band would be open across to South America and further across to Europe. There is a shift upwards and across to Japan with a path also evident across North America before it will open over the short path approximately 1 to 2 hours later. This is often accompanied by Southern Asian and Middle East area with a short break into Central Europe.

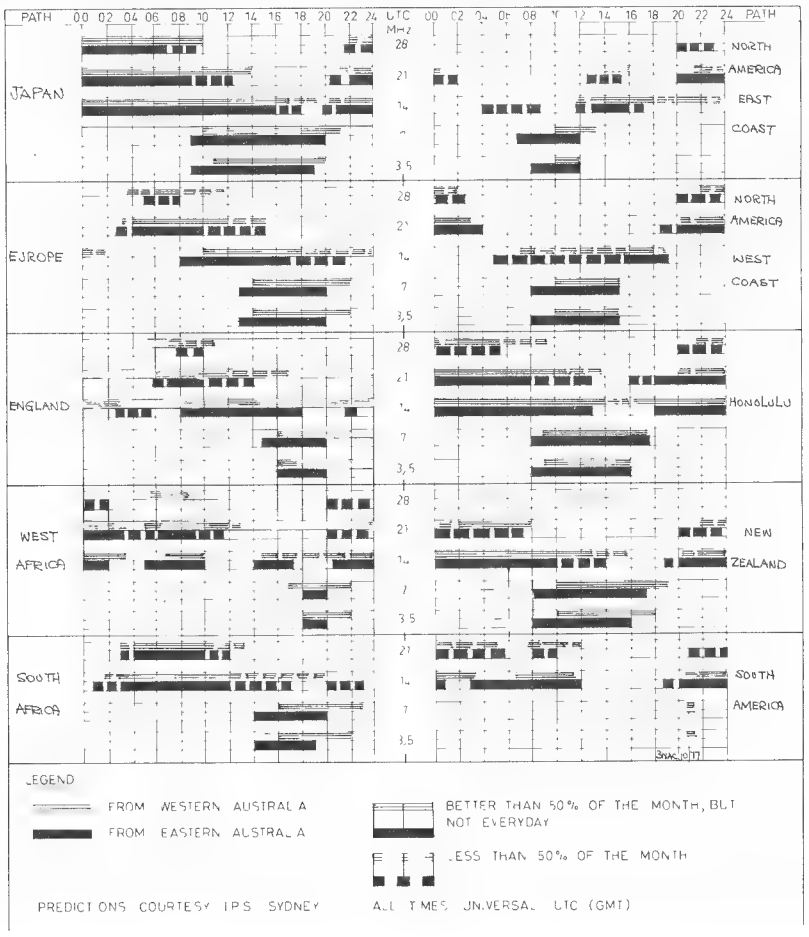
The same occurs on the UK path reversing from long path around 0400Z to short path around 1100Z. The time interval can alter if a path is found over the North Pole in between the route changes. It makes DX all the more interesting and intriguing.

From these references it can be said that generally from sunrise to sunset on the higher HF bands 28, 21, 14 MHz the bands open from the east first (while 7 and 3 MHz are looking backwards across darkness paths).

Coming towards noon, an arc from Central America stretching northwards through Japan to western Asian areas start to come alive. As the day progresses and heads towards late afternoon, the eastern opening (short path) starts to lessen and the long path openings start to appear. All very dependant on the earth's actual position relative to sun, etc. This period can produce some interesting DX on virtually all bands. Then as the sun sweeps further west, illuminating the greater part of Europe, etc., then the activity switches east to west.

When the solar cycle is well advanced and activity from above is relatively high (often for a week at a time) then the trail of high ionization will allow both openings to remain for long periods, even until the next earth revolution recommences, to add to the good conditions. Some of these signs are already evident on 14 and 21 MHz.

If perchance the predictions for the new cycle reach anywhere near the proportions of the 1958



TRANSVERTER MODEL MMT432/144

UTILIZING an IF of 144 MHz ★ 10 WATTS DRIVE or ½ WATT ★ VOX OPERATED

This 432 solid state linear transverter is intended for use with a 144 MHz transceiver to produce a high reliability transceive capability. A 10 watt load and RF sensing network eliminates the need for any ancillary circuitry. A single coaxial connection is all that is required between the transverter and the associated 144 MHz transceiver.
A wide range of applications is offered by this MMT432/114 transverter, which by virtue of its linear mode of operation will enable 144 MHz SSB, FM, AM or CW equipment to be used at 432 MHz.

Simply connect direct to your 2 metre rig, 12 volt supply, fit 70 cm antenna for instant SSB, FM, AM, CW operation.

FEATURES: High quality double-sided glass fibre printed board ★ Highly stable zener controlled oscillator stages ★ PIN diode aerial changeover relay with less than 0.2 dB through loss ★ Extremely low noise receive converter, typical 3 dB ★ Separate receive converter output gives independent receiver facility ★ Built in Automatic RF VOX with override facility ★ Built in 10 watt 144 MHz termination, selectable attenuator for ½ watt ★ Use of the latest state of the art Power Amplifier transistors provide reliable 10 watts continuous output.

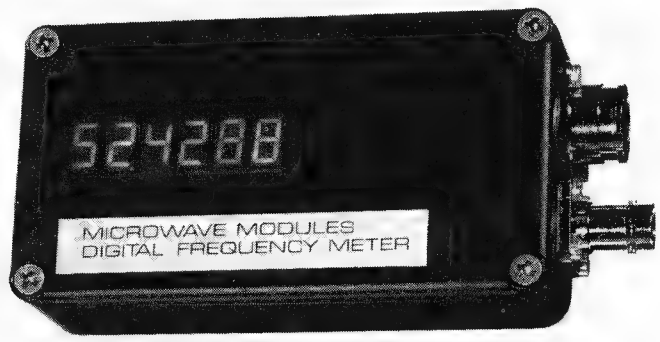
MODEL MMT432/144 — Price $260

NEW RELEASE – TRANSVERTER MODEL MMT432/28S

Features extended coverage for Oscar 8.

Second Crystal Oscillator gives two ranges: Low, 432-434 MHz — High, 434-436 MHz. Programming available to either Transmit/Receive both Low, both High, or a mixture of the two. Adjustable Drive Level is now provided by an input potentiometer. Optional RF VOX.
Power Output 10 watts minimum ★ 28 MHz IF ★ Drive 1 mW to 500 mW ★ Aerial Changeover by PIN diode switch ★ Modern Microstrip Techniques ★ Power requirements 12 volt nominal at 150 mA 2.5 amp. peak ★ Case size 187 x 120 x 53 cm ★ Spare 432 input socket.

MODEL MMT432/28S — INTRODUCTORY PRICE: $235.



MMT432 TRANSVERTER

500 MHz COUNTER

SPECIFICATION

Digit Height	10 mm
Display Width	45 mm
Case Size	111 x 60 x 27 mm
Frequency Ranges	0.45 - 50 MHz, 50 - 500 MHz
Sensitivity	Better than 50 mV RMS over 0.45 - 50 MHz. Better than 200 mV RMS over 50 - 500 MHz
Input Connector	50 ohm BNC
Input Impedance	200 ohm approximately
Power Connector	5 pin 270 deg. locking DIN socket (supplied with plug)
Power Requirements	11 - 15 volts DC at 300 mA approximately

Model MMD050/500 — 500 MHz Counter, $175

LINEAR AMPLIFIERS

FOR 70 CM — 90-100 WATT

AVAILABLE SHORTLY

New Release — 6 METRE MOSFET CONVERTER

FEATURES 24 MHz LOCAL OSCILLATOR OUTPUT FOR TRANSVERTER USE.

Input Frequency: 52-54 MHz
I.F. Output Frequency: 28-30 MHz
Typical Gain: 30 dB
Noise Figure: 2.5dB
Typical image rejection: 65dB
Crystal Oscillator Frequency: 24 MHz
Power requirements: 12 volt ± 25% at 35 mA.

MODEL MMC52/28LO — Price $49.00

2 METRE VERSION — WITH 116 MHz LOCAL OSCILLATOR OUTPUT FOR TRANSVERTER USE.

MODEL MMC144/28LO — Price $49.00

NEW READY-TO-OPERATE MODULES AVAILABLE IN THE SALES PROGRAM OF VHF COMMUNICATIONS

1296 MHz CONVERTER
Microstripline, Schottky diode mixer.
IF: 28-30 MHz or 144-146 MHz.
Noise figure: typ. 8.5 dB.
Overall gain 25 dB. **Price: $65**

432 MHz CONVERTER
2 silicon pre-amplifier stages. MOSFET mixer. All UHF circuits in microstrip technology.
Noise figure: typ. 3.8 dB.
Overall gain: typ. 30 dB.
IF: 28-30 MHz or 144-146 MHz 9-15 V 30 mA. **Price: $51.**

144 MHz MOSFET CONVERTER
Noise figure: typ. 2.8 dB.
Overall gain: typ. 30 dB.
IF: 28-30 MHz, 9-15 V 20 mA.
Price: $45

VARACTOR TRIPLER 432/1296 MHz
Max. input at 432 MHz: 24 W (FM, CW) - 12 W (AM).
Max. output at 1296 MHz: 14 W.
Price: $74

Pack and Post $1

All modules are enclosed in black cast-aluminium cases of 13 cm by 6 cm by 3 cm and are fitted with BNC connectors. Input and output impedance is 50 ohms. Completely professional technology, manufacture, and alignment. Extremely suitable for operation via OSCAR 7 or for normal VHF/UHF communications.

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
ONWARDS forwarding. Please add sufficient for freight or postage, excess will be refunded.

Australian Distributors for Microwave Modules Limited:

AMATEUR ELECTRONIC IMPORTS

P.O. BOX 160, KOGARAH 2217, N.S.W.

PHONE: (02) 547 1467

era, then the bands are going to be really interesting. QRM will in all effect be like the CB type QRM evident on 27 MHz. Even a small improvement on last year's conditions will certainly increase the Novice DXers' expectations, not forgetting the others up the top end of 21 MHz.

I cannot see any really significant upward trend in solar activity as yet. Though the 2800 MHz Solar Flux figures are steadily rising, they still remain in the mid 80s. When it rises to a consistently 100 plus, then we will feel its effects quite dramatically. Take the time to listen to WWV at 18 minutes past the hour for solar indices for the previous GMT day. Solar Flux and A index are first. Low A index figure will reflect on the geomagnetic field — Quiet, Unsettled or Disturbed. The K index for Boulder at 6 hourly intervals give a reasonably good picture of geomagnetic activity. K0 — 3 = Quiet, K3 — 5 = Unsettled, K5 plus = Disturbed (storm conditions). A falling A index over a few days and a rising Solar Flux are very good indicators of forthcoming good conditions. Around 0618, 0718, 0818Z in East Australia on 10 MHz appear to provide good signals. Have a listen and familiarise yourself with this valuable information.

Hope to have more interesting news next month. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN June 1977
A Common Useful Frequency Standard Usable by Amateurs; More on the ZL2AOM Transceiver; A New Lease of Life for the Leader Model LSG-11 Signal Generator; Voltmeter Check on Electrolytic Capacitors; My New Toy; The TCI Net; A Note on the Origins of Radio.

CQ June 1977
Provinciales, the DX edition Paradise of the Caicos Islands; Coherent CW; Versatility and the VOM; The WB2DCX Plumbicon SSTV Camera; The Phantom Strikes Again; The Kenwood TR-7400A 2 Metre Transceiver.

HAM RADIO April 1977
Solid State Microwave Power Generators; Five Band SSB Transmitter; Remote Base for VHF-FM Repeaters; Graphical Coil Winding Aid; How to Use the RF Power Meter; 2300-MHz Bandpass Filter; Antenna-Transmission Line Analog; Novel LED Circuits; Medical Relay by Satellite; Better Audio for Receivers.

QST July 1977
A Domestic Crisis Looms; Watts from the Wind; Profile of a Hard-Core Experimenter; Full Break-In and RIT for the HW-8 QRP Transceiver; Build This Solid-State Titan; Beat the Noise with a "Scoop Loop"; A Simple Approach to Complex Circuits; A 60-Watt Solid-State UHF Linear Amplifier; The Yesu FT-221 Multi-Mode Two-Metre Transceiver; Toward the Ultimate Amateur Satellite; FCC WARC Proposals, Round 2; Assessing the CD Appointment Structures; Results, Fourth Annual ARRL Ten-Metre Contest; 1977 ARRL International DX Competition High-Claimed Scores.

RADIO COMMUNICATION May 1977
The Ultimate Keyer; WARC 1979; The "disappearing inductance" — A New Trick and Some Better Beams; A New Era in Amateur Radio; Multiple Beacons and other Aspects of Microwave Band Planning.

RADIO COMMUNICATION June 1977
A Television and SSB Transmitter for 432 MHz; Crystal Calibrator and Band Edge Marker.

RADIO COMMUNICATION July 1977
The DSB1 Mk. 2, A Simple Sideband Transmitter for the Beginner; The Heathkit SB-104 all Solid-State HF Bands Transceiver.

RADIO ZS April 1977
Counters are not Magic — They're Simple; Simple 2-Metre Oscar Aerial; Amateur Radio — Yesterday and Today; Oscar Pre-amp — 10m Down Link; The Barlow-Wadley XRC-30 Receiver Mark 2; The Katsumi Electroic Co. Programmable Memory Keyer, Mk. 1024; Modification of the Barlow-Wadley XCR-30.

WIRELESS INSTITUTE OF AUSTRALIA

Federal President: Dr. D. A. Wardlaw VK3ADW

Federal Council:
VK1 Brig. R. K. Roseblade VK1QJ
VK2 Mr. T. I. Mills VK2ZTM
VK3 Mr. C. K. Maude VK3ZCK
VK4 Mr. N. F. Wilson VK4NP
VK5 Mr. I. J. Hunt VK5QX
VK6 Mr. N. R. Penfold VK6NE
VK7 Mr. P. D. Frith VK7PF

Staff: Mr. P. B. Dodd VK3CIF, Secretary.
Part-time: Col. C. W. Perry, Mrs. J. M. Seddon and Mr. T. Cook (AR advertising).

Executive Office: P.O. Box 150, Toorak, Vic., 3142. 2/517 Toorak Rd., Toorak, Ph. (03) 24 8652.

Divisional information (all broadcasts are on Sundays unless otherwise stated):

ACT:
President — Mr. S. W. Grimsley VK1VK
Secretary — Mr. D. J. Farquharson VK1ZDF
Broadcasts— 3570 kHz & 146.5 MHz: 10.00Z.

NSW:
President — Mr. T. I. Mills VK2ZTM
Secretary — Mr. I. A. Mackenzie VK2ZIM
Broadcasts— 1825, 3595, 7146 kHz, 28.5, 52.1, 52.525, 144.1, Ch. 8 and other relay stations: 01.00Z. (Also Sunday evenings 09.30Z and Hunter Branch, Mondays 09.30Z on 3570 kHz and ch. 3 and 6).

VIC.:
President — Mr. S. T. Clark VK3ASC
Secretary — Mr. J. A. Adcock VK3ACA
Broadcasts— 1825, 3600, 7135 kHz — also on 6m, 2m SSB and 2m Ch. 2 repeater: 00.30Z (Also on Radio 3HA).

QLD.:
President — Mr. D. T. Laurie VK4DT
Secretary — Mr. P. Brown VK4PJ.
Broadcasts— 1825, 3580, 7146, 14342 kHz: 0.900 EST.

SA:
President — Mr. C. J. Hurst VK5HI
Secretary — Mr. C. M. Pearson VK5PE
Broadcasts— 1815, 3550, 7125, 14175 kHz, 146.5, 145.7, 146.8 (ch. 4), 431.965 6m and 2m (Ch. 8): 09.00 SAT.

WA:
President — Mr. R. Greenaway VK6DA
Secretary — Mr. N. R. Penfold VK6NE
Broadcasts— 3600, 7080, 14100, 14175 kHz, 52.656 and 2m (Ch. 2): 01.30Z.

TAS.:
President — Mr. R. K. Emmett VK7KK
Secretary — Mr. H. E. Hewens VK7HE
Broadcasts— 3570, 7130 kHz: 09.30 EST.

NT:
President — Mr. Doug Haig VK8JD.
Secretary — Mr. Henry Anderson VK8HA.
Broadcasts— Relay of VK5WI on 3.55 MHz and on 146.5 MHz at 2330Z. Slow morse transmission by VK8HA on 3.555 MHz at 1000Z almost every day.

Postal information:
VK1 — P.O. Box 1173, Canberra, 2601
VK2 — 14 Atchison St., Crows Nest, 2065 (Ph. 43 5795 Tues & Thurs (10.00-14.00h).
VK3 — 412 Brunswick St., Fitzroy, 3065 (Ph. (03) 41 3535 Sat 10.00-12.00h).
VK4 — G.P.O. Box 638, Brisbane, 4001.
VK5 — G.P.O. Box 1234, Adelaide. 5001 — HQ at West Thebarton Rd., Thebarton (Ph. (08) 254 7442).
VK6 — G.P.O. Box N1002, Perth, 6001.
VK7 — P.O. Box 1010, Launceston, 7250.
VK8 — (incl. with VK5), Darwin AR Club, P.O. Box 1418, Darwin, 5794.

Slow morse transmissions — most week-day evenings about 09.30Z onwards around 3550 kHz.

RADIO ZS May 1977
Simple Fault Finding in Receivers; Ambidextrous Paddle for Electronic Keyers "Apek"; Another Means of Communication; Incremental Tuning for the Swan 350 Transceiver.

SHORTWAVE MAGAZINE May 1977
Socket Panel for the KW-2000B; Aspects of Radio Communications Receivers; No Test Gear? Use Your Receiver; Satellite Telecommand Centre at the University of Surrey; Mini-ZL Special for Twenty Metres.

SHORTWAVE MAGAZINE June 1977.
Electronic Keyer; A 21 MHz Attic Array for the Short Wave Listener; Aspects of Communications Receivers; A Simple Tone-Modulator for a GDO; Phase Lock Loop Morse Decoder. ■

C.A.R.E.

(COMMUNITY AMATEUR RADIO EVENTS)

Mr. Bob Slutzkin (VK3SK) is sitting in his radio "shack" at his East St. Kilda home.

At precisely 3.30 p.m., he zeros in on 14.315 megahertz.

He is listening in as private yachts and other small vessels in the Pacific Ocean east and north-east of Australia as checks are made to see if they have an emergency, a medical problem or a priority message.

A message comes back saying a man named Cunningham has slipped on a jetty on the US controlled island Palryma, in the Polynesia group.

Cunningham, his wife and three young children are cruising the Pacific and were resting on the deserted island when the accident happened.

The amateur radio operators then go to work.

Details of injuries, food and water supplies are taken. A landbase operator in the Pacific advises not to eat the fish in the lagoon on the island because they are poisonous.

Messages are relayed and the US navy comes to the rescue and takes Mr. Cunningham to hospital.

And so ends another rescue initiated by the Pacific Maritime Mobile Net — affectionately known as the "Mickey Mouse" Net.

The Net is run on a strictly volunteer basis within the rules of amateur radio operation to ensure safety at sea.

Ted Mulholland 55, retired (VK4AEM), is the central base in Caloundra, Queensland, which makes the initial checks on the vessels to see if they have problems.

Ted keeps a running log of small craft movements within the area it covers.

The Net covers the Pacific, South China Sea, north-western waters and the Indian Ocean combining one sector at a time.

From Melbourne "Herald", 5/8/77.

AROUND THE TRADE

NEW PRODUCTS — VHF SWITCHED ATTENUATORS SERIES 2100

The units, available from Scalar Distributors Pty. Ltd., provide precise switched attenutation from 1 to 100 dB in steps of 1 dB. This range of Hatfield attenuators is exceptionally neat and compact and is housed in bondene aluminium cases fitted with switched attenuator pads.

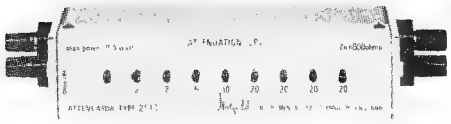
Models available: BNC terminations —

2100 50 ohm, silver switch contacts; 2105 50 ohm, gold switch contacts; 2110 75 ohm, silver switch contacts; 2115 75 ohm, gold switch contacts. DC to 250 MHz.

2120 600 ohm unbal., silver switch contacts; 2125 600 ohm unbal., gold switch contacts. DC to 5 MHz.

*2130 600 ohm bal., silver switch contacts; *2134 600 ohm bal., gold switch contacts. DC to 1 MHz.

* These types incorporate socket type pillar terminals and can be used up to above 1 MHz. ■



REDUCED COST FILTERS

Spectrum International Inc., who are regular advertisers in AR, have advised that in the light of galloping inflation, they have actually been able to reduce costs of their filters, etc., to last year's prices.

The new price lists will appear in subsequent editions of AR, however, in the meantime should any readers be wishing to avail themselves of their products, then we recommend that you revert to the prices stated in AR prior to January 1977. ■

ATV NEWS

KEVIN CALLAGHAN VK3ZVJ
PETER COSSINS VK3BFG

We have started to get a fair amount of feedback from this regular column, which should be of interest to most ATVers. I received a very newsy letter from Peter VK4ZWP in Brisbane. Peter and Graham VK4ZCH are using home-made solid state transmitters to the design of DJ4LB as published in VHF COMMUNICATIONS in February and May 1973. [illegible]r uses a Philips LDH005 and Graham a [illegible]aden HV-15 camera. Antennae are Jaybeam 18 element yagis and the old reliable VK2ZIM convertors with BFR19 pre-amps. Other calls in the Brisbane area playing ATV are Nev VK4ZNC, Paul VK4ZBV and Doug VK4ZDL. The former two have had ATV gear going for some time. Thanks very much, Peter, for the information, and I will be dropping you a line in the very near future answering your other questions.

Due to the untiring efforts of Ross VK3ZFV on his recent holiday to VK2 and VK4 we are able to bring you some more news of activity. In the Lismore area there is a small pocket of activity comprising Harold VK2AWH, Warwick VK2ZLD and a few others. There is at least one DJ4LB transmitter and a few converted UHF car phones. I believe that they use Channels 40 or 50 for liaison. The antenna systems that they all use are phased arrays.

Unconfirmed reports from the Hunter River area tell that some of the stations involved with ATV are VK2ZVM, VK2BMB, VK2ZKF and VK2AHE. There are also unconfirmed reports of an ATV repeater in the Gosford area, which is keyed on by a 2 metre carrier. Obviously they do not have any of the simpletons that we have in Melbourne who delight in interfering with repeaters and generally making a nuisance of themselves. It has been brought to our notice that some of the smaller pockets of ATV activity are looking for more information on how to better their transmissions and reception. If you have any questions that you want to ask or any little gimmicks that you can let the other ATVers know of, we can publish this information in this column. Also if you have any ATV gear to flog, or wish to buy, let us know also, we can probably help.

The 40 metre net on 7085 MHz between VK5KG and VK3AHJ on Sunday mornings discussing ATV welcomes ATVers from all States to join in the contact. This contact starts after the ATV segment on the VK3BWI broadcast about 10.45 EAST.

In Mt. Gambier, VK5TH has now obtained a camera and is concentrating on setting up his transmitter.

Peter VK3ZPA recently had a visit from the gang from Bendigo to line up some converters and arranged to lend a camera and transmitter to VK3XO, who has been throwing pictures around the area. VK3AXT in Katunga is also playing pictures.

Les VK3ZBJ and Ron VK3AHJ had a visit from Bill VK3AMI and VK3ZL from the Ballarat area and are setting up an ATV net in that area.

I have found that the bandpass filter as described in VHF COMMUNICATIONS for November 1971 has been a great help in getting rid of all the extraneous signals that are received on the standard VK2ZIM converter. I strongly recommend the design. The type number is DL6MH002.

Rod VK6RH is reported to be playing ATV using club equipment and he is sending pictures to VK6PR. Rod is moving very shortly to Albany and will be transmitting pictures to the eastern States and looking for their pictures. Adelaide and Melbourne, keep your eyes and ears open. A lot of people in Melbourne are starting to use the 88 element Jaybeams and are getting very good results on 426.25 MHz. It may surprise a lot of non-VK3 readers that the latest count of regular ATV viewers in Melbourne is up to over 80 with over 30 capable of transmitting. This is a large increase from our first report and much is due to the never decreasing efforts of Ron VK3AHJ and the Melbourne ATVers owe him a lot.

Activity in Melbourne is still very high, with a number of stations experimenting with various types of visual display units. Included in this issue is a PROM callsign generator modified by Kevin VK3ZVJ. It produces two lines of six letters, synchronising pulses being provided by an existing camera or external generator. If you have no facilities for programming PROMS, contact Kevin or one of the Melbourne ATV group for assistance.

The VK3ZBJ ATV converters are now available; contact Les direct for prices and deliveries. ■

QSP

NEW PREFIX

According to a note in Radio Communication, August 1977, the prefix series H6A-H6Z has been provisionally allocated by the ITU to the Solomon Islands on attaining independence.

CB RFI

Whatever the benefits of citizens' band radio, Americans are finding there is a price to be paid.

Last year the Federal Communications Commission received more than 100,000 complaints from people whose TV sets, radiograms or tape decks were interfered with by CB radio.

Peter Smark reports from San Francisco that the problem was brought home to one of the commissioners one recent Sunday morning.

He was attending church when a burst of CB chit-chat came from the electric organ in the middle of a Bach chorale.

From "The Age", 12/8/77.

NOVICE MANUAL OF QUESTIONS AND ANSWERS

A circular from Westlakes Radio Club, Box 1, Teralba, NSW 2284, advises that the Manual, now in its revised and expanded fifth edition of 164 pages, is available from the Club at $3.50 per copy, post paid.

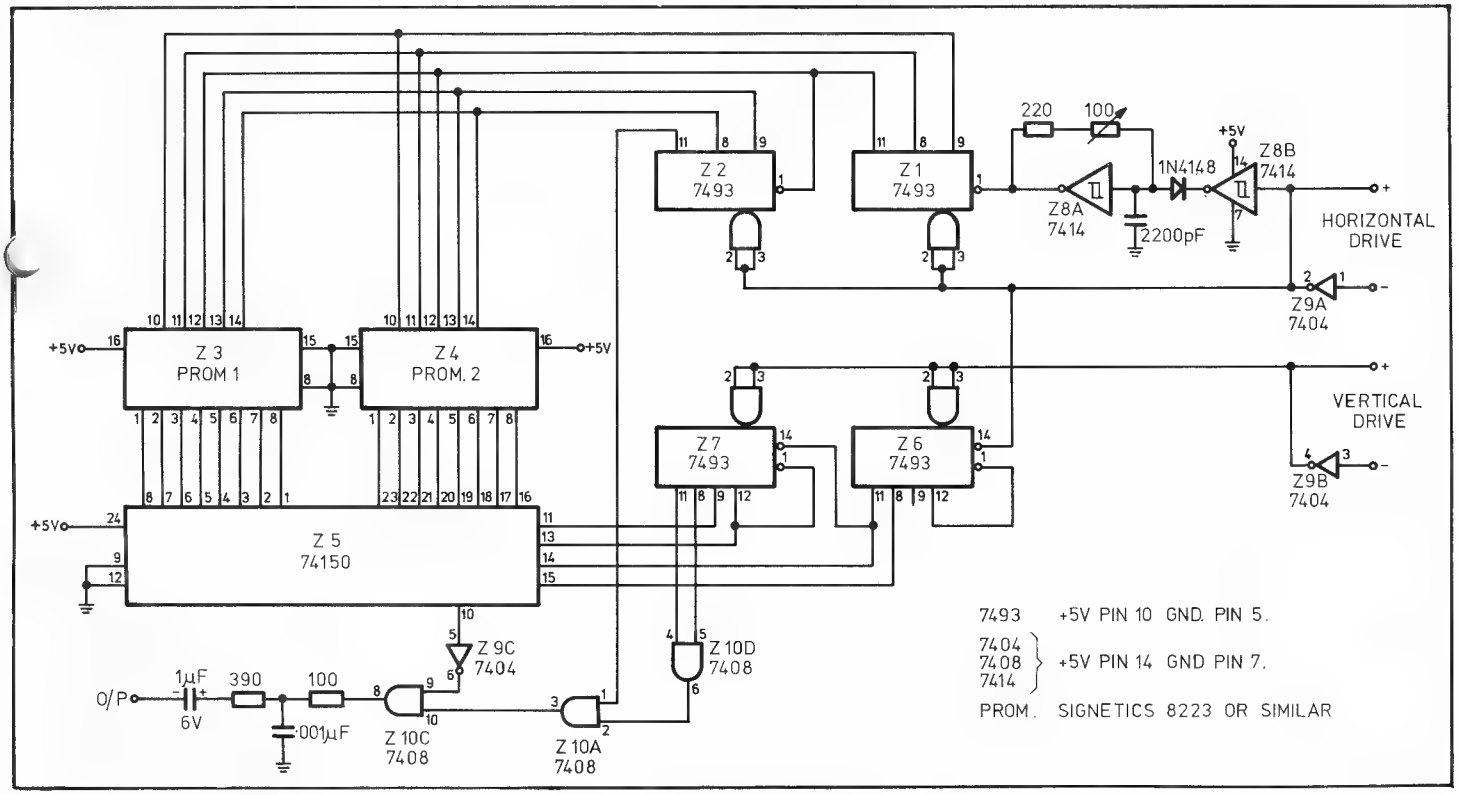


FIG. 1: ATV Callsign Generator.

QSP

RADIO AMATEURS OLD TIMERS CLUB
The RAOTC was founded by Bob Cunningham VK3ML following upon a successful dinner attended by some 45 members at the Science Club Melbourne in 1975. The club is purely a social one.

Membership is open to any ham who was licensed 25 years ago. There are some 150 members spread throughout Australia. After attaining membership, a member may nominate any other amateur at home or abroad, if it comes to that.

There is no subscription to the RAOTC as funds for postages etc. are obtained from a small levy made at the annual dinner. The certificate of membership costs $2 to cover printing and postage which should be sent when making application for membership to:

Membership Secretary,
Harry Cliff VK3HC,
P.O. Box 50, Point Lonsdale, Victoria
Phone (03) 052 52 1608.
In VK2 speak with either Len Grey VK2AKO or Gil Miles VK2KI.
In VK7 speak with Jack Batchler VK7JB.

The Club is looking for membership contacts in all other States.

From Bob Cunningham VK3ML. ■

NEW PREFIX
To mark Finland's 60th year of political independence Finnish amateurs have been authorised to substitute the prefix OF in place of the normal OH from 1st July to 31st December 1977.

OUTBACK Dx
VK8ZER (also VK8NER), Ed Roache of the Met. Bureau advises he will be operating portable from Giles Weather Station until the end of the year. Giles is about 400 miles SW of Alice Springs. He will be looking for QSOs on the 80, 15 and 10m Novice segments, as well as 6m, 2m and 70 cm FM and SSB, also via the satellite. QSL manager is VK8GG (VK8NGR QTHR in new call book). ■

HFers AND OTHERS
April '77 QST reports that the President of HF International has been the subject of an FCC call for hearing on his application for renewal of a CB licence. This call mentions a number of illegal activities urged or condoned by HFI and its publication.

LICENCE APPLICATIONS
21,500 amateur and 980,253 CB applications were received in January by the FCC. More arrived in just five days of the month than during the whole of 1973. End of January figures showed 293,655 amateurs and 8,159,176 CBers were licensed at the end of the month. QST April '77.

DILEMMA — COST v SERVICE
The "Editorial" in April 1977 QST contains items which look rather familiar. "But the problem is that, despite all of this, the (FCC) has not been able to obtain approval of a budget large enough to cope". The Division "has streamlined the CB license-issuing process so that it costs less than a dollar to issue a CB licence. But they still don't have enough money and people to handle the flood. Many of the recent actions taken and proposed by the (FCC) were designed to reduce the cost of regulating the amateur service. New programs, even though beneficial to the amateur Service can't be considered at this time, according (FCC), because to implement the programs would cost money, and there is no money". "Perhaps the higher taxes (for more money) wouldn't be necessary if there were fees which were calculated in a realistic cost basis and if the income from these fees went directly to FCC to support the regulation of the stations which paid the fees" (instead of going into General Revenue).

STATEMENT OF POLICY
"In the future, all amateurs will be asked to show us their FFCC Amateur Radio licence or a photocopy when purchasing a transmitter, transceiver or amplifier designed for the Amateur Service . . . we reserve the right to refuse sale of amateur transmitting or amplifier devices to anyone unwilling or unable to provide the above information". Noted from an advertisement in Worldradio May 1977, explaining the reasons for this self-imposed decision.

PURITY OF EMISSIONS
FFCC Docket 20777 lays down new amateur rules for purity of emissions, states Worldradio May '77, but ARRL has filed petitions relating to it. From 15th April harmonics and other spurious signals must be reduced 40 dB below the mean power of the fundamental for transmissions on frequencies less than 20 MHz and must not exceed 50 milliwatts. Above 30 MHz spurii must be reduced 60 dB and must not exceed 25 mW.

NEW ZEALAND NOVICES
According to Break-In for June 1977 the New Zealand Novice licensing is now official. No certificates will be issued but $6.00 is the fee for the non-renewable licence. Call signs will be ZL1, 2, 3 and 4 NAA up, the frequency band 3525-3575 kHz, mode AM, SSB and CW, xtl controlled Tx and power up to 100W DC input to the final. The once only Novice exam comprises a simple written theory exam, a regulations exam and a three-minute morse test at 6 wpm.

KOREA
A publicity package advises that the 8th Korea Electronics Show will be held from 18th to 25th October 1977 in the Kordea Machinery Permaent Exhibition Hall, Yol-do, Seoul. The exhibits range from Consumer Electronic products (including CB transcelvers) to measuring instruments, components and various industrial items.

INATTENTION KILLS
In a report from the Sydney "Daily Telegraph" on 17/8/77 it was reported that a motorist who drove through a red light and killed an 8-year-old girl, had apparently been distracted by his car radio.

The girl had been on a pedestrian crossing outside a school.

The motorist pleaded guilty to culpable driving.

This is a sad lesson learnt the hard way.

Do not let **anything,** particularly microphones, distract you when you are driving.

Submitted by Max Riley VK2ARZ.

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded. Repeats may be charged at full rates.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book (note for October AR only — because of delays in processing, the 1975 Call Book refers).

FOR SALE

Pye Model F10 2m FM Transceiver (solid state Rx and exciter), 10W output, with channels 2, 4, 8 and 40, mobile mount and circuit, $85. VK3ZHI, QTHR. Ph. (03) 90 4937.

Bendix RA-1B Aircraft Receiver, .15-18 MHz, with AC pwr. supply (home brew) and handbook, goes well, $60. VK3ZHI, QTHR. Ph. (03) 90 4937.

3 Element 20 metre ZYGI Beam, as new, complete with BN86 balun, $90 ONO. Unused X beam hub casting, insulators, instruction sheet, etc., $15. Drake 2A receiver, 80-10 metres plus 27 MHz, good condition, $150. VK3ARZ, QTHR. Ph. (03) 232 9492.

Kenwood TR-220G 2m FM Transceiver, fitted with repeater channels 2-8 plus channels 40 and 50 simplex. As new, complete with mike and handbook, $190.00. VK3ML. Ph. (03) 20 7780.

Teleprinter, Model 15, brand new, complete, $70. VK3ZY, QTHR. Ph. (03) 277 4748 A.H., (03) 630 5981 Bus.

Amateur Station, only three months old, comprising latest Swan transceiver 700CX SS-16B, fitted 16 pole SSB filter, separate combined power supply and speaker unit model 230XC, fitted VOX or PTT as selected, Shure 444 desk mike, Tx power input rating 700W on SSB and 400W DC on CW, with comprehensive kit of support spares to keep this rig on the air for some time to come. This station recently cost $1,100 or more to purchase, but a realistic $980 will secure. Good reason for selling, will not separate any item. VK2BFJ, QTHR (1977 edition). Ph. (043) 32 5758.

Frequency Counter, Dick Smith 7 digit kit set, $96, as per EA March 1977. VK6TU, QTHR. Ph. (09) 349 9342.

Yaesu FT2FB 2m mobile, fitted with chns. 40, 50, 2, 4, 5, 6, 8, in very good condition, $150. VK6DY, QTHR. Ph. (092) 87 1103.

Portable 6-band, short wave Rx (Sanyo). SW 2 MHz to 28 MHz, 4 bands, MW 510 to 1600 kHz, FM 87 to 108 MHz, only 6 months old, still brand new. Has telescopic aerial, optional AC or DC and many other features. Sold with AC power cord. Price $45. John Brereton, 27 Kent Ave., Brahma Lodge 5109, S.A.

Moving QTH, all going cheap. FS6 Mk. 2 Rx R3084A, Rx BC733, No. 19 dynamotor 12V, tuning unit, 6 ft. iron rack, radio tower, sun[illegible] crts., valves, transformers, tuning condensers, old mags and lots other bits. Prices, you name it. VK3HK, QTHR

Realistic DX-160 communications Rx, ideal SWLs, excellent condition, $140, ONO. VK3BJE. Ph. (03) 435 4599 A.H.

Atlas 210X with dig R/O plus P/S and ex. spkr., also matching tmfr. for mobile ant., $850. VK3BDY, 131 Mickleham Rd., Tullamarine 3043. Ph. (03) 338 2105.

2m FM solid state hand-held portable transceiver, on ch. 40 charger and rechargeable nicads, .6W out., type TTR-8B G/C, $75, ONO. Vinten RT13 solid state power supply 3/12 output, unmodified, working on 120 MHz AM, $15, ONO. VK4ZFM, 3 Belbora Rd., Shailers Pk. 4128. Ph. (07) 209 8105.

80m Transverter, in case, missing PA stage. Will cover entire 80m band on 23 channel 27m transceiver, $47. Richard Cowles VK2NBN. Ph. (02) 699 9403.

ICOM IC22 2m FM Transceiver, channels 40, 50, 51, R2, R3, R4, R5, R6, R7, R8, $200. B. White VK2AAB. Ph. (02) 487 1428.

Yaesu FRDX400-FLDX400 Rx-Tx combination, complete with cables and manuals; Tx has socket fitted to run transverters, 28-29 MHz on 10, good operating condition, $420. Ken. KP202 hand held, chs. A, 40, 2, 8 plus 2 Ja, nicad batteries and charger, $100. VK3ASQ, QTHR. Ph. (052) 78 1886 A.H., (052) 78 9660 Bus.

Lafayette Micro P450 UHF tunable 450-470 MHz Rx, suitable St. John's freq. commercial mobile monitor, or UHF CB, $150. Ph. (03) 232 9616.

Estate Late VK3XM. Hallicrafters HT37 Tx, Drake 2B Rx, home built linear amplifier, Hammerland HQ 129X Rx/Tx, Geloso G222 TR, ICOM digital VFO DV21, Heathkit SB610, oscilloscope, antenna Rotor Ham II still in carton, bound copies of CQ and QST from 1955. Contact Mr. Butler. Ph. (03) 96 4757.

Yaesu FT301S, brand new, $650; Yaesu FT301, brand new, $850; National HRO m. Rx, top condition, manual, coils, etc., $120. Cliff. Ph. (065) 52 2722 Bus.

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CQ Magazine, almost complete 1960-69, several years "73". Best offer. VK2AAK. Ph. (02) 635 1320.

Collins KWM2 Transceiver, purchased new, no mods., excellent DX unit, plus PM2 Collins portable power supply, $1,100. Collins calibrated stainless steel portable multi-dipole 637T, all frequencies, mint condition, $130. GDO UHF megacycle meter, 420-940 mc., by Measurements Ltd., with power supply, $120. VK2AAK. Ph. (02) 635 1320.

IC212 similar to IC215, fitted with 9 sets of xtls, repeaters 2-8, simplex ch. 40 and 50, as new, ex. cond., $200. CB Tram XL5, 23 ch., SSB mobile and base, aerials, as new, $320. John VK2WW, QTHR. Ph. (02) 543 1927.

Kenwood TR-2200G, 2W out., 146 MHz, FM portable transceiver, 12 ch. xtls for 12 VK repeater and simplex ch. fitted, as new, used very little, with all accessories, $250, includes Kenwood owner's manual. Hallicrafters HT-37 SSB/AM CW Tx, 100W out., 80-11-10m, two 6146 PA tubes, excellent condition, $200, includes Hallicrafters owner's manual. Electro-voice model 619TR dynamic omni directional mic., with integral transistorised compressor amplifier in base, in original box, excellent condition, $55. James Goodger VK2JO. Ph. (02) 36 2981 or write GPO, Box 5076, Sydney 2001.

Yaesu FT400S (same as 401), complete with remote VFO and spare finals (6KD6s); fitted with noise blanker, 160m and internal speaker, excellent condition, in original carton, $400. VK5BI, QTHR. Ph. (086) 82 2899.

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Yaesu FT620B, as new, $480, ONO. VK5AS, QTHR. Ph. (086) 82 2899 Bus., Cowell 144 A.H

Heathkit HP13, 12V mobile pwr. sup., 750/250/var. bias; Bendix RA10B compass rcvr.; AWA carphone, pwr. sup., offers. VK2DT, 2 Patya Close, Epping 2121. Ph. (02) 868 1131.

WANTED

FT75B/BS FV50 VFO and AC P/S required by new Novice. Will consider FT200B and AC P/S, manuals required. Theo Vidler VK1NAR, 18 Heysen Cl., Weston 2611, ACT. Ph. (062) 88 1767 A.H.

Yaesu FL2500 Linear Amplifier. VK5AS, QTHR. Ph. (086) 82 2899 Bus., Cowell 144 A.H.

Any old vintage radios, old gramophones or music boxes, or parts, such as valves, dials, cabinets, etc. VK2DT, 2 Patya Close, Epping 2121. Ph. (02) 868 1131.

Buy or borrow manuals or circuits for No. 19 Mk. 2, No. 108 Mk. 3, No. 11 and a set marked "Aust. Arm. AME". Will pay for photostats. VK4SS, QTHR.

Licensed Amateur (full call) for private tutoring a student going for licence. Prefer local person. Fee negotiable (Theory only). Ph. (03) 97 6031 (Moorabbin).

Handbook for Yaesu FT-2F, English version; buy or borrow for copying. I have Japanese version only. VK3ZFI, QTHR. Ph (03) 90 5347

Ken. KP202, with or without nicads and/or charger. VK2BC, QTHR. Ph. (02) 663 2924.

Transceiver, FT200 or similar unit, complete, to establish base station for amateur who has lost both legs. Details, price, etc., to Lew Ansell VK2BTO, 131 Prince St., Waratah 2298, Newcastle. Ph. (049) 68 4390.

Mini-Products Hybrid Quad Antenna, 6-10-15-20m. Details and price to Ken VK6ZA, Box 768, Carnarvon 6701. Ph. (099) 41 1001.

Swan 410 VFO, Swan VOX unit. VK2BEJ, QTHR.

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SILENT KEYS

It is with deep regret that we record the passing of —

Mr. W. E. SALMON	VK2SA
Rev. H. A. HARRIS	VK2HT
Mr. J. F. BULL	VK4FH
Mr. S. C. BAKER	VK3BK

JOSEPH FRANCIS (JOHN) BULL VK4FH

John passed away on 25th July.

Born in Egham, Kent, in England, in 1908, he came to Australia in 1929, later serving with the RAAF in World War II.

Licensed in 1947, John conducted many antennae experiments, particularly with the English G8PO.

With 53 award certificates to his credit, this would give some understanding of his love for amateur radio.

The sympathy of all amateurs is extended to his wife Anne, a daughter Mrs. Fong of Western Australia, and a brother Rev. Fr. Anthony Bull, living in England

A. J. MACKENZIE VK4ZAN

HARRY HARRIS VK2HT

Although an early boyhood desire to built crystal sets did not lead to a career in electronics, the late Reverend Harry Harris was actively interested in amateur radio right up until his death in July of this year.

A member of WIA for many years, his words of encouragement and enthusiasm will be remembered by the many amateurs with whom he came into contact either on the air or in person. Perhaps it was the dedicated and talented support of his wife, Merle, that enabled Harry to find time to care for the many needs of two Parishes and still find time to assist with the supervision of YRCS examinations in the St. George District and to help in other ways.

Harry joined the RAAF in 1942 as a part-time Chaplain and transferred to full time duty in June 1943. He was stationed at Pearce, WA, Cootamundra, NSW, and at Horn Island, where he was attached to the 73rd Radar Wing.

At Brighton-le-Sands, Sydney, in the early sixties Harry was active on 40 metres with his 3BZ and dipole and later with a Swan 350 and ground plane which, mounted on the roof of his single-storey shack at about 10 feet and with "random length radials" and surrounded by "high rise" apartment buildings, brought the world to his doorstep in such a fashion that he was the envy of friends with more elaborate arrays who somehow suspected that he must have had some assistance "from upstairs".

After his retirement from active work in the ministry, Harry and Merle moved to Croydon, Sydney, where, with an FT 200 and a 3-element mono-band beam for 20 metres and a back yard the "size of a sixpence", Harry again had the world at his fingertips and there can be no doubt that the cheerful voice of "TWO HOTEL TANGO" will be long remembered and sadly missed.

JOHN VK5YY

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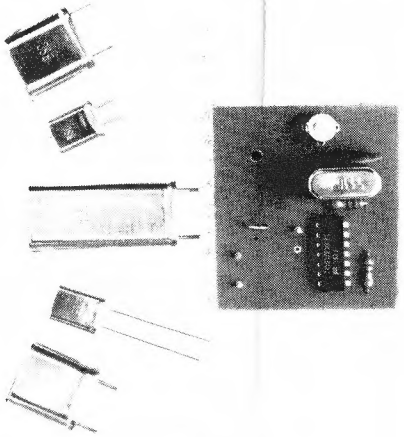

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VICTORIAN DIVISION

Component Trading

Further to our notice in September Amateur Radio stating that our component trading will cease at 31st December, 1977, we hereby give notice that all outstanding credits in respect of such components must be presented by 30th November, 1977, and unless so presented by that date to the Victorian Division

412 Brunswick Street, Fitzroy, Victoria 3065

will be deemed null and void.

(Signed) Secretary,
WIA Victorian Division.

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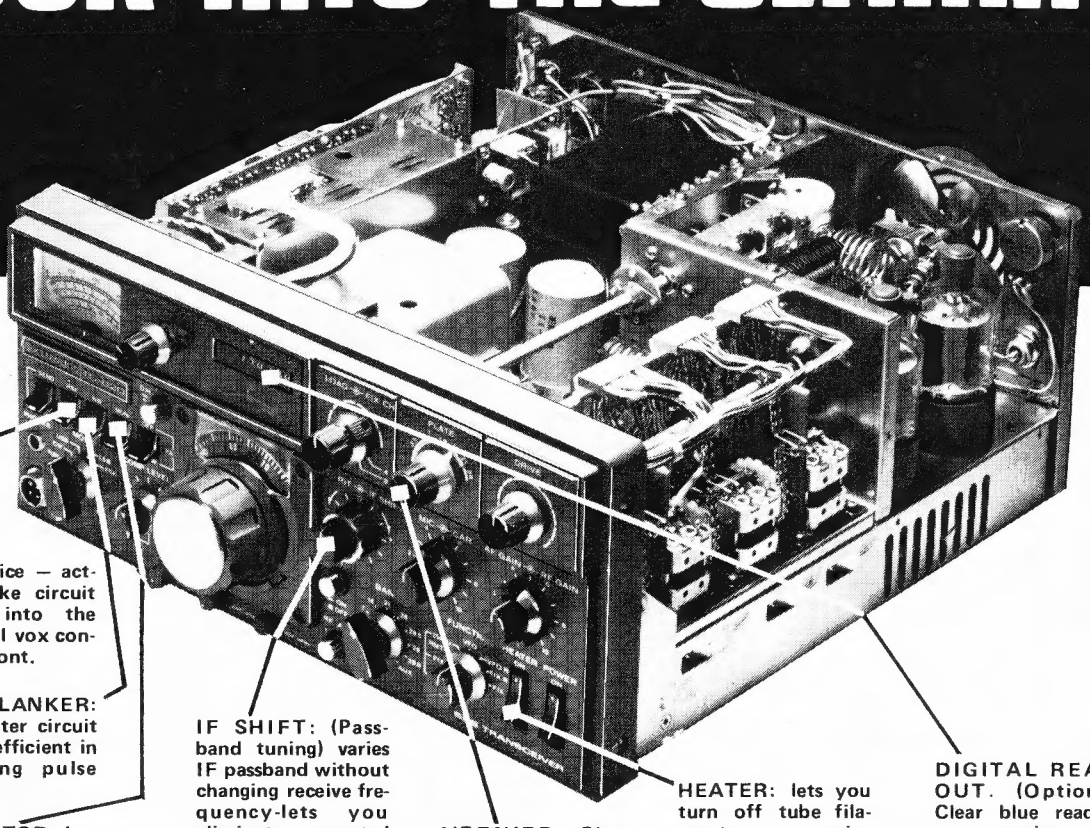
OCTOBER 1977
Vol. 45, No. 10

LOOK INTO THE ULTIMATE



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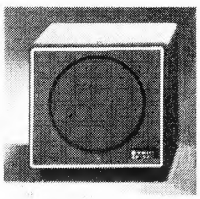

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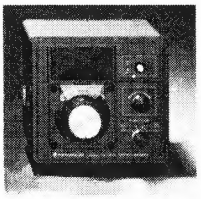

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